PB82-231150

EPA Utility FGD Survey: July-September 1981

PEDCo-Environmental, Inc.
Cincinnati, OH

Prepared for

Industrial Environmental Research Lab.
Research Triangle Park, NC

Dec 81

U.S. Department of Commerce
National Technical Information Service

United States
Environmental Protection
Agency

EPA-600/7-81-012e
December 1981

EPA

Research and Development

PB82-231150

EPA UTILITY FGD SURVEY:
JULY - SEPTEMBER 1981

Prepared for

Office of Environmental Engineering and Technology

Prepared by

Industrial Environmental Research
Laboratory
Research Triangle Park NC 27711

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA 22161

IERL-RTP-1282

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-600/7-81-012e	2.	3. RECIPIENT'S ACCESSION NO. PB82-231150
4. TITLE AND SUBTITLE EPA Utility FGD Survey: July-September 1981		5. REPORT DATE December 1981 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) M. Smith, M. Melia, and N. Gregory		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS PEDCo Environmental, Inc. 11499 Chester Road Cincinnati, Ohio 45246		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO. 68-02-3173, Task 55
12. SPONSORING AGENCY NAME AND ADDRESS EPA, Office of Research and Development Industrial Environmental Research Laboratory Research Triangle Park, NC 27711		13. TYPE OF REPORT AND PERIOD COVERED Quarterly; 7-9/81 14. SPONSORING AGENCY CODE EPA/600/13

15. SUPPLEMENTARY NOTES IERL-RTP project officer is Norman Kaplan, Mail Drop 61, 919/541-2556. The report supplements EPA-600/7-81-012a and -012b.

16. ABSTRACT The report is the last of three supplements updating the October-December 1980 report (EPA-600/7-81-012a and -012b) and should be used in conjunction with it. The report, generated by a computerized data base system, surveys operational and planned domestic utility flue gas desulfurization (FGD) systems. It summarizes information contributed by the utility industry, process suppliers, regulatory agencies, and consulting engineering firms. It alphabetically tabulates domestic FGD systems by development status (operational, under construction, or in planning stages), utility company, process supplier, process, and waste disposal practice. It gives data on boiler design, fuel characteristics, FGD system design, and actual performance. It includes unit by unit dependability parameters and discusses problems and solutions associated with the boilers and FGD systems. Process flow diagrams and FGD system economic data are appended.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group	
Pollution	Boilers	Pollution Control	13B	13A
Flue Gases	Maintenance	Stationary Sources	21B	
Desulfurization		Utility Boilers	07A,07D	
Electric Utilities				
Waste Disposal			15E	
Electric Power Plants			10B	

18. DISTRIBUTION STATEMENT Release to Public	19. SECURITY CLASS *(This Report)* Unclassified	21. NO. OF PAGES 365
	20. SECURITY CLASS *(This page)* Unclassified	22. PRICE

EPA Form 2220-1 (9-73)

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EPA-600/7-81-012e
December 1981

EPA UTILITY FGD SURVEY
JULY - SEPTEMBER 1981

By

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Contract No. 68-02-3173
Task 55

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Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Research and Development
Washington, DC 20460

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NOTICE

This report (prepared by PEDCo Environmental, Inc., Cincinnati, Ohio under EPA Contract No. 68-02-3173, Task No. 55) is provided as an information transfer document. Data in this report are supplied voluntarily by utility representatives; flue gas desulfurization (FGD) system suppliers and designers; regulatory agencies; and others. Neither EPA nor the designated contractor warrants the accuracy or completeness of information contained in this report.

Distribution of a project summary will be made to organizations and individuals indicating a specific interest in the field of FGD technology. Those interested can get on the mail list for the project summary by contacting Norm Kaplan, Industrial Environmental Research Laboratory, at 919/541-2556, or the Emission and Effluent Technology Branch secretary at 919/541-2578. Copies of the full report and preceding issues can be purchased from National Technical Information Service, Springfield, Virginia, 22161.

This report presents a summary of the FGD system design and performance data from a computerized data based called, "Flue Gas Desulfurization Information System" (FGDIS). Access to the FGDIS is available to the public (subject to the limitations expressed in the paragraph above) through the National Technical Information Service (NTIS) for a non-profit usage charge. Users have the capability of accessing the additional design and performance data stored within the data base that cannot be conveniently printed in this report. Direct access to the data base allows statistical analyses of the data (e.g., averages, maxima, minima, and standard deviation of various parameters) and tabulation of the data to fit the individual informational needs of the user. Those interested should contact Walter Finch (NTIS) at 703/487-4808.

USE OF THIS REPORT

This report is the last of three supplementary issues to the October-December 1980 report. Supplementary issues are cumulative in nature, so that it is necessary to retain only the latest issue and the October-December 1980 report (EPA-600/7-81-012a and b).

It should be noted that along with the design and performance data for operational FGD systems contained in Section 3, this report also contains a number of tables presenting tabulations of some of the key data. The Executive Summary contains the number and capacity of FGD systems as of the end of September 1981, future projections (December 1999) of controlled and uncontrolled generating capacity, and unit by unit summaries of status changes and performance during the period.

Appended to this report is a section containing reported and adjusted cost data for U.S. FGD systems in which operational systems are stressed (Appendix A). Also included in the appendices are definitions, a table of unit notation, and FGD process flow diagrams.

ABSTRACT

This report, generated by a computerized data base system, presents a survey of operational and planned domestic utility flue gas desulfurization (FGD) systems. It summarizes information contributed by the utility industry, system and equipment suppliers, system designers, research organizations, and regulatory agencies. It presents data on system design, fuel characteristics, operating history and actual performance. Unit by unit dependability parameters are included and problems and solutions associated with the boilers, scrubbers, and FGD systems are discussed.

The FGD systems are tabulated alphabetically by development status (operational, under construction, or in the planning stages), utility company, system supplier, process, waste disposal practice, and regulatory class. FGD system economic data, definitions, and a glossary of terms are appended to the report. Current data for domestic FGD systems show 92 systems in operation, 42 systems under construction, and 88 planned systems. Projected 1999 FGD controlled capacity in the U.S. is 107,197 MW.

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EXECUTIVE SUMMARY

This report is prepared quarterly (every three months) by PEDCo Environmental, Inc., under contract to the Industrial Environmental Research Laboratory/Research Triangle Park of the U.S. Environmental Protection Agency. It is generated by a computerized data base system, the structure of which is illustrated in Figure 1.

Table 1 summarizes the status of FGD systems in the United States at the end of September 1981. Table 2 lists the units that have changed status during the third quarter 1981, and Table 3 shows the performance of operating units during this period.

TABLE 1. NUMBER AND TOTAL CAPACITY OF FGD SYSTEMS

Status	No. of units	Total controlled capacity, MW*	Equivalent scrubbed capacity, MW†
Operational	92	34,937	31,738
Under construction	42	18,226	17,457
Planned:			
Contract awarded	16	9,385	9,169
Letter of intent	11	8,293	8,235
Requesting/evaluating bids	10	5,630	5,630
Considering only FGD systems	51	30,726	30,398
TOTAL	222	107,197	102,627

* The summation of the gross unit capacities (MW) brought into compliance with FGD systems regardless of the percent of the flue gas scrubbed by the FGD system(s).

† The summation of the effective scrubbed flue gas in equivalent MW based on the percent of flue gas scrubbed by the FGD system(s).

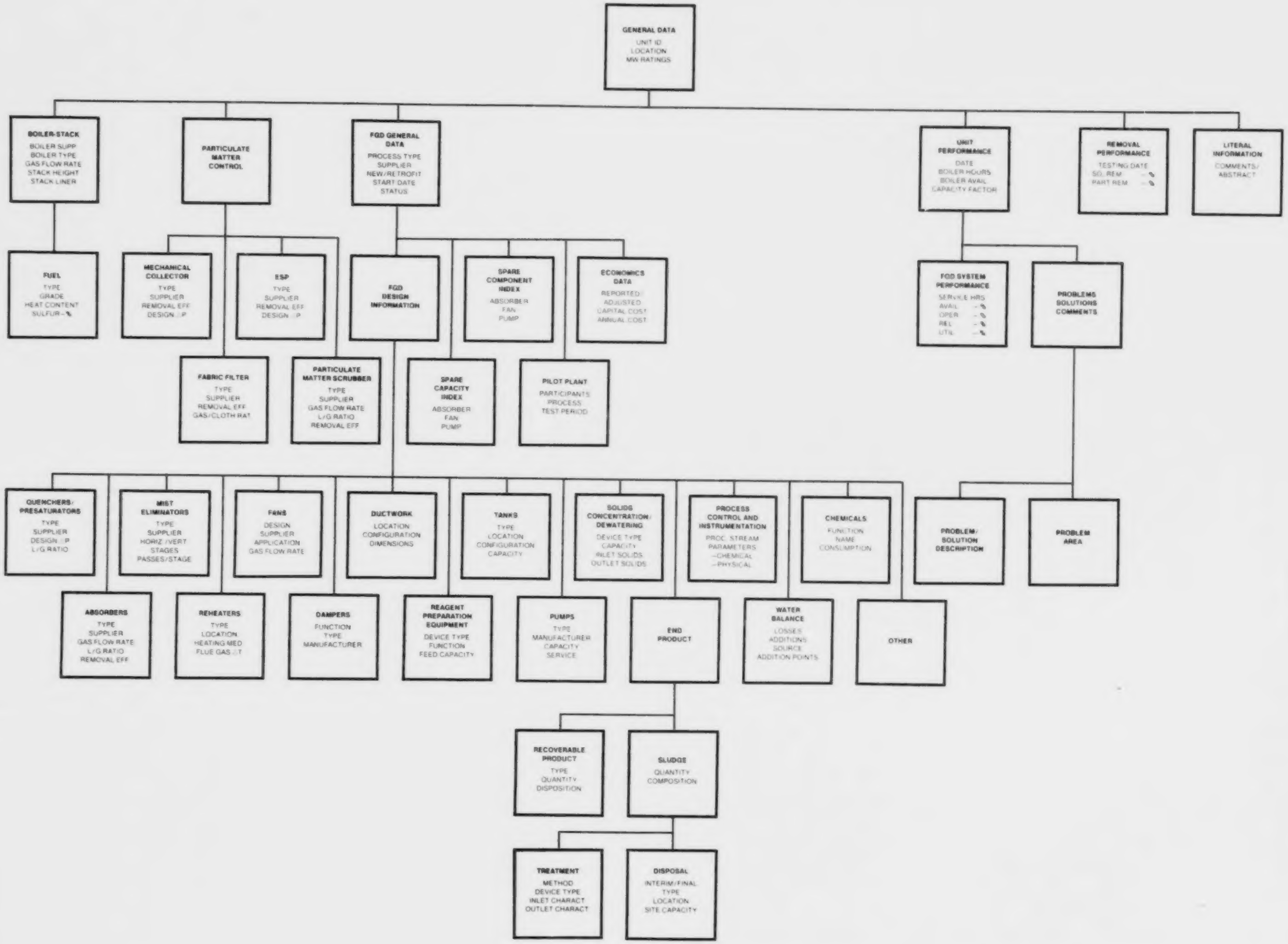
GENERAL DATA
UNIT ID
LOCATION
MW RATINGS
BOILER-STACK
BOILER SUPP
BOILER TYPE
GAS FLOW RATE
STACK HEIGHT
STACK LINER
PARTICULATE MATTER CONTROL
FGD GENERAL DATA
PROCESS TYPE
SUPPLIER
NEW/RETROFIT
START DATE
STATUS
UNIT PERFORMANCE
DATE
BOILER HOURS
BOILER AVAIL
CAPACITY FACTOR
REMOVAL PERFORMANCE
TESTING DATE
SO_2 REM —%
PART REM —%
LITERAL INFORMATION
COMMENTS/ ABSTRACT
FUEL
TYPE
GRADE
HEAT CONTENT
SULFUR—%
MECHANICAL COLLECTOR
TYPE
SUPPLIER
REMOVAL EFF
DESIGN ΔP
ESP
TYPE
SUPPLIER
REMOVAL EFF
DESIGN ΔP
FABRIC FILTER
TYPE
SUPPLIER
REMOVAL EFF
GAS/CLOTH RAT
PARTICULATE MATTER SCRUBBER
TYPE
SUPPLIER
GAS FLOW RATE
L/G RATIO
REMOVAL EFF
FGD DESIGN INFORMATION
SPARE COMPONENT INDEX
ABSORBER
FAN
PUMP
SPARE CAPACITY INDEX
ABSORBER
FAN
PUMP
ECONOMICS DATA
REPORTED/ ADJUSTED
CAPITAL COST
ANNUAL COST
PILOT PLANT
PARTICIPANTS
PROCESS
TEST PERIOD
FGD SYSTEM PERFORMANCE
SERVICE HRS
AVAIL —%
OPER —%
REL —%
UTIL —%
PROBLEMS SOLUTIONS COMMENTS
QUENCHERS/ PRESATURATORS
TYPE
SUPPLIER
DESIGN ΔP
L/G RATIO
MIST ELIMINATORS
TYPE
SUPPLIER
HORIZ./VERT
STAGES
PASSES/STAGE
FANS
DESIGN
SUPPLIER
APPLICATION
GAS FLOW RATE
DUCTWORK
LOCATION
CONFIGURATION
DIMENSIONS
TANKS
TYPE
LOCATION
CONFIGURATION
CAPACITY
SOLIDS CONCENTRATION/ DEWATERING
DEVICE TYPE
CAPACITY
INLET SOLIDS
OUTLET SOLIDS
PROCESS CONTROL AND INSTRUMENTATION
PROC. STREAM PARAMETERS
—CHEMICAL
—PHYSICAL
CHEMICALS
FUNCTION
NAME
CONSUMPTION
PROBLEM/ SOLUTION DESCRIPTION
PROBLEM AREA
ABSORBERS
TYPE
SUPPLIER
GAS FLOW RATE
L/G RATIO
REMOVAL EFF
REHEATERS
TYPE
LOCATION
HEATING MED
FLUE GAS ΔT
DAMPERS
FUNCTION
TYPE
MANUFACTURER
REAGENT PREPARATION EQUIPMENT
DEVICE TYPE
FUNCTION
FEED CAPACITY
PUMPS
TYPE
MANUFACTURER
CAPACITY
SERVICE
END PRODUCT
WATER BALANCE
LOSSES
ADDITIONS
SOURCE
ADDITION POINTS
OTHER
RECOVERABLE PRODUCT
TYPE
QUANTITY
DISPOSITION
SLUDGE
QUANTITY
COMPOSITION
TREATMENT
METHOD
DEVICE TYPE
INLET CHARACT
OUTLET CHARACT
DISPOSAL
INTERIM/FINAL
TYPE
LOCATION
SITE CAPACITY

Figure 1. Computerized data base structure diagram.

TABLE 2. SUMMARY OF CHANGES July - September 1981

FGD status report July 31, 1981	Operational		Under construction		Contract awarded		Letter of intent		Requesting/ eval. bids		Considering FGD		Total	
	No. 88	MW^a 30,158	No. 40	MW^a 15,887	No. 21	MW^a 11,599^b	No. 11	MW^a 8,235	No. 19	MW^a 10,340	No. 48	MW^a 28,618^b	No. 227	MW^a 104,837^b
Arizona Public Service														
Four Corners 4			+1	755	-1	755								
Four Corners 5			+1	755	-1	755								
Basin Electric Power														
Antelope Valley 2			+1	440	-1	440								
Laramie River 2	+1	570	-1	570										
Central Illinois Light														
Duck Creek 2									-1	450	+1	450		
East Kentucky Power														
J. K. Smith 2							-1	650					-1	650
Kentucky Utilities														
Hancock 1							+1	650	-1	650				
Hancock 2									-1	650	+1	650		
Nevada Power														
Warner Valley 1									-1	295			-1	295
Warner Valley 2									-1	295			-1	295
Northern States Power														
Wisconsin Coal 1											-1	670	-1	670
Pacific Power & Light														
Jim Bridger 1									-1	550	+1	550		
Jim Bridger 2									-1	550	+1	550		
Jim Bridger 3									-1	550	+1	550		
Plains Electric G & T														
Plains Escalante 1			+1	233	-1	233								
San Miguel Electric														
San Miguel 1	+1	400	-1	400										
Seminole Electric														
Seminole 1			+1	620	-1	620								
South Carolina Public Service														
Winyah 4	+1	280	-1	280										
Southern Illinois Power														
Marion 5											-1	300	-1	300
Sunflower Electric														
Holcomb 1			+1	347	-1	347								
Utah Power & Light														
Naughton 3	+1	330	-1	330										
West Texas Utilities														
Oklaunion 1					+1	720			-1	720				
Total	92	31,738	42	17,457	16	9,169	11	8,235	10	5,630	51	30,398	222	102,627

[a] Equivalent scrubbed capacity.

[b] This value was modified slightly due to a MW correction.

TABLE 3. PERFORMANCE OF OPERATIONAL UNITS
JULY - SEPTEMBER 1981

Plant	FGD system capacity, MW[a]	Flue gas % scrubbed	FGD capacity on line during period, MW[a,b]	No information for this period, MW[a]	Shut down throughout period, MW[a]	July 1981 Dependability %[c,e]				August 1981 Dependability %[c,e]				September 1981 Dependability %[c,e]			
						AVL	OPR	REL	UTL	AVL	OPR	REL	UTL	AVL	OPR	REL	UTL
Alabama Electric																	
Tombigbee 2	179	70		179													
Tombigbee 3	179	70		179													
Arizona Electric Power																	
Apache 2	98	50	98			100	91	100	91	100	40	100	36	100	99	100	99
Apache 3	98	50	98			100	69	100	69	100	100	100	100	62	63	62	62
Arizona Public Service																	
Cholla 1	119	100		119													
Cholla 2	264	100		264													
Cholla 4	126	33		126													
Four Corners 1	175	100		175													
Four Corners 2	175	100		175													
Four Corners 3	229	100		229													
Basin Electric Power Coop																	
Laramie River 1	570	100	570			100	95	100	95	97	96	100	92	100	94	100	25
Laramie River 2	570	100	570							96	69	100	68	100	82	100	67
Big Rivers Electric																	
Green 1	242	100	242			98	96	96	96	95	93	93	85	85	96	96	80
Green 2	242	100	242			94	89	89	77	97	94	94	86	100	99	99	98
Central Illinois Light																	
Duck Creek 1	416	100	416			72	63	75	54	75	74	76	74				
Central Illinois Public Service																	
Newton 1	617	100	617			89	70	99	68	100	82	100	82	100	81	100	69
Cincinnati Gas & Electric																	
East Bend 2	650	100	650														
Colorado Ute Electric Association																	
Craig 1	410	90			410	0	0	0	0	0	0	0	0	0	0	0	0
Craig 2	410	90	410			0	0	0	0	33	34	34	33	51	52	53	50
Columbus & Southern Ohio Electric																	
Conesville 5	411	100	411			100	100	100	55	99	53	92	41	94	54	91	6
Conesville 6	411	100	411			99	100	100	74	99	90	93	74	95	86	96	36
Commonwealth Edison																	
Powerton 51	450	100			450				0				0				0

TABLE 3 (continued)

Plant	FGD system capacity, MW[a]	Flue gas % scrubbed	FGD capacity on line during period, MW[a,b]	No information for this period, MW[a]	Shut down throughout period, MW[a]	July 1981 Dependability %[c,e]				August 1981 Dependability %[c,e]				September 1981 Dependability %[c,e]			
						AVL	OPR	REL	UTL	AVL	OPR	REL	UTL	AVL	OPR	REL	UTL
Cooperative Power Association																	
Coal Creek 1	327	60	327				37		37		45		36				0
Coal Creek 2	327	60	327				42		37		44		34		60		60
Delmarva Power & Light																	
Delaware City 1	60	100	60			99	99	99	99	77	77	77	47	95	95	95	95
Delaware City 2	60	100	60			77	77	77	77	99	98	98	98	99	96	96	87
Delaware City 3	60	100	60			99	99	99	99	100	100	100	100	90	90	90	90
Duquesne Light																	
Elrama 1-4	510	100	510			99	95	99	95	98	81	98	81				
Phillips 1-6	408	100	408			74	72	73	72	75	64	70	58				
Indianapolis Power & Light																	
Petersburg 3	532	100		532													
Kansas City Power & Light																	
Hawthorn 3	90	100	90			100	100		52	100	100		10	100	100		58
Hawthorn 4	90	100	90			96	100		49	100	100		18	100	100		3
La Cygne 1	820	100	820			97	80	95	54								
Kansas Power & Light																	
Jeffrey 1	540	75	540														
Jeffrey 2	490	70	490														
Lawrence 4	125	100	125														
Lawrence 5	420	100	420														
Kentucky Utilities																	
Green River 1-3	64	100			64	100			0	100			0	100			0
Louisville Gas & Electric																	
Cane Run 4	188	100	188			73	100	100	73	40	66	66	40	61	100	100	61
Cane Run 5	200	100	200			46	100	100	46	50	100	100	50	75	100	100	75
Cane Run 6	299	100	299			74	69	69	57	80	73	77	68	100	98	98	22
Mill Creek 1	358	100	358			76	75	75	72	99	99	99	99	86	96	96	80
Mill Creek 3	427	100	427			63	74	74	63	89	92	92	88	81	81	81	81
Paddy's Run 6	72	100			72	100			0	100			0	100			0
Minnesota Power & Light																	
Clay Boswell 4	475	85	475			100	86	100	75	100	80	100	73	100	89	100	84
Minnkota Power & Light																	
Milton R. Young 2	185	42	185			29	32	33	29	58	49	50	44	100	97	100	86
Monongahela Power																	
Pleasants 1	618	100		618													
Pleasants 2	618	100		618													

TABLE 3 (continued)

Plant	FGD system capacity, MW[a]	Flue gas % scrubbed	FGD capacity on line during period, MW[a,b]	No information for this period, MW[a]	Shut down throughout period, MW[a]	July 1981 Dependability %[c,e]				August 1981 Dependability %[c,e]				September 1981 Dependability %[c,e]			
						AVL	OPR	REL	UTL	AVL	OPR	REL	UTL	AVL	OPR	REL	UTL
Montana Power																	
Colstrip 1	360	100		360													
Colstrip 2	360	100		360													
Montana-Dakota Utilities																	
Coyote 1	440	100	440														
Nevada Power																	
Reid Gardner 1	125	100	125			100	99	100	95	99	99	99	93	96	91	95	77
Reid Gardner 2	125	100	125			99	97	99	78	98	98	98	96	100	99	100	99
Reid Gardner 3	125	100	125			97	96	97	93	98	98	98	98	100	98	100	75
Northern Indiana Public Service																	
Dean H. Mitchell 11	115	99			115	100	0		0	100	0		0	100	0		0
Northern States Power																	
Riverside 6,7	110	N/A[d]		110													
Sherburne 1	740	91	740														
Sherburne 2	740	91	740														
Pacific Power & Light																	
Jim Bridger 4	550	100		550													
Pennsylvania Power																	
Bruce Mansfield 1	917	100	917							97							
Bruce Mansfield 2	917	100	917							97							
Bruce Mansfield 3	917	100	917							99							
Public Service Co. of New Mexico																	
San Juan 1	361	100	361			100	97	100	96	100	100	100	100	100	75	90	32
San Juan 2	350	100	350			93	80	86	80	100	54	100	43	69	19	19	19
San Juan 3	534	100	534			98	96	97	96	86	86	86	86	97	32	32	31
Salt River Project																	
Coronado 1	280	80	280														
Coronado 2	280	80	280														
San Miguel Electric																	
San Miguel 1	400	100	400														
Sikeston Board of Municipal Utilities																	
Sikeston 1	235	100			235				0				0				0
South Carolina Public Service Authority																	
Winyah 2	140	50	140			89	93	96	44	98	98	98	98	96	98	96	88
Winyah 3	280	100	280			88	83	84	82	82	84	82	70	98	96	98	86
Winyah 4	280	100	280														

TABLE 3 (continued)

Plant	FGD system capacity, MW[a]	Flue gas % scrubbed	FGD capacity on line during period, MW[a,b]	No information for this period, MW[a]	Shut down throughout period, MW[a]	July 1981 Dependability %[c,e]				August 1981 Dependability %[c,e]				September 1981 Dependability %[c,e]			
						AVL	OPR	REL	UTL	AVL	OPR	REL	UTL	AVL	OPR	REL	UTL
South Mississippi Electric																	
R.D. Morrow, Sr. 1	124	62	124			100	99	99	94	100	100	100	100	99	99	99	98
R.D. Morrow, Sr. 2	124	62	124			100	97	100	93	100	100	100	96	98	98	98	98
Southern Illinois Power Coop																	
Marion 4	173	100	173			74	74	94	74	52	47	60	47				
Southern Indiana Gas and Electric																	
A.B. Brown 1	265	100	265			91	84	87	84	92	89	89	89	98	97	90	90
Springfield City Utilities																	
Southwest 1	194	100	194			97	93	96	93	98	87	90	87	89	78	85	76
Springfield Water, Light, & Power																	
Dallman 3	185	90	185			54	44	44	42	0	0	0	0				
St. Joe Zinc																	
G.F. Weaton 1	60	N/A[d]	60			0	0	0	0	0	0	0	0	5	5	5	5
Tennessee Valley Authority																	
Shawnee 10A	10	N/A[d]		10													
Shawnee 10B	10	N/A[d]		10													
Widows Creek 7	575	100	575														
Widows Creek 8	550	100			550				0				0				0
Texas Power & Light																	
Sandow 4	382	70	382														
Texas Utilities																	
Martin Lake 1	595	75	595														
Martin Lake 2	595	75	595														
Martin Lake 3	595	75	595														
Monticello 3	800	100	800														
Utah Power & Light																	
Hunter 1	360	90	360														
Hunter 2	360	90	360														
Huntington 1	366	85	366														
Naughton 3	330	100	330														
Total	31,738		25,228	4,614	1,896												

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a Equivalent scrubbed capacity.

b This category includes the flue gas capacity being handled by the FGD system at least part of the time during the report period.

c The percent figures listed are average values for all system scrubbing trains during the period.

d Flue gas % scrubbed for prototype and demonstration units is not applicable unless the system is designed to bring a unit into compliance with SO_2 emission standard.

e Availability, operability, reliability, and utilization as defined in Appendix C of this report.

Current projections indicate that the total power generating capacity of the U.S. electric utility industry will be approximately 831 GW by the end of 1999.[1] (This value reflects the annual loss resulting from the retirement of older units, which is considered to be 0.4% of the average generating capacity at the end of each year.[2]) Approximately 373 GW or 45% of the 1999 total will come from coal-fired units. The distribution of power generation sources, both present (December 1980) and future (December 1999) is shown in Table 4.[1]

TABLE 4. POWER GENERATION SOURCES: PRESENT AND FUTURE

	Coal	Nuclear	Oil	Hydro	Gas	Other	GW (total)
December 1980	41%	10%	24%	12%	12%	1%	616
December 1999	45%	15%	19%	11%	9%	1%	831

Based on the known commitments to FGD by utilities as presented in Table I, the percentage of electrical generating capacity controlled by FGD for both the present (September 1981) and the future (December 1999) is shown in Table 5.

TABLE 5. FGD CONTROLLED GENERATING CAPACITY: PRESENT AND FUTURE

	Coal-fired generating capacity controlled by FGD, %	Total generating capacity controlled by FGD, %
September 1981*	13.8	5.7
December 1999	28.7	12.9

*The number of committed FGD systems is as of September 1981; however, the figure used for the total generating capacity and coal-fired generating capacity is based on the available December 1980 figures.

In light of the revised New Source Performance Standards, actual FGD control is expected to be greater than what is reflected by the figures above. For example, about 50 to 60 systems representing approximately 29,000 to 31,000 MW of generating capacity presently fall into the uncommitted category. These are systems that cannot be included in the committed group at this time because information regarding their status is not ready for public release.

In an effort to show general FGD usage and projected usage trends, Table 6 gives a current (September 1981) and a projected (December 1999) breakdown of throwaway product systems versus salable product systems as a percent of the total known commitments to FGD as of the end of the third quarter 1981:

TABLE 6. SUMMARY OF FGD SYSTEMS BY PROCESS

		Percent of total MW	
		September 1981	December 1999
Throwaway product process			
°Wet systems			
Lime		36.8	20.6
Limestone		48.7	36.9
Dual alkali		3.7	2.0
Sodium carbonate		4.0	3.1
NA[a]		-	5.2
°Dry systems			
Lime		0.3	3.4
Lime/Sodium carbonate		-	0.1
Sodium carbonate		1.4	0.4
Salable product process			
°Process	°Byproduct		
Aqueous carbonate/ spray drying	Elemental sulfur	-	0.1
Citrate	Elemental sulfur	0.2	0.1
Lime	Gypsum	-	0.1
Limestone	Gypsum	-	0.2
Lime/limestone	Gypsum	-	0.5
Magnesium oxide	Sulfuric acid	-	0.7
Wellman Lord	Sulfuric acid	2.3	1.2
Wellman Lord	Elemental sulfur	2.6	0.8
Process undecided		-	24.6
Total		100.0	100.0

[a] NA - Not available (these systems are committed to a throwaway product process; however, the actual process is unknown at this time).

HIGHLIGHTS: JULY - SEPTEMBER 1981

The following paragraphs highlight FGD system developments during the third quarter 1981.

Arizona Electric Power reported that the Apache 2 FGD system achieved 100% availability for the months of July, August, and September. The Apache 3 FGD system achieved 100% availability during July and August but dropped to 62% availability during September as a result of damper problems.

Arizona Public Service announced that construction began during the period on the lime FGD systems that are being retrofitted to control SO2 emissions from Four Corners 4 and 5. Both units are rated at 755 MW (gross) and burn coal with an average sulfur content of 0.75%. The FGD systems are being supplied by United Engineers and are slated for initial start-up in December 1984.

Basin Electric Power announced that construction of the lime/spray drying FGD system being installed on Antelope Valley 2 began during the third quarter. This new unit will be rated at 440 MW (gross) and will fire coal with an average sulfur content of 0.68%. The FGD system is being supplied by Joy Manufacturing/Niro Atomizer and is scheduled for initial operation in October 1985.

The Laramie River 1 FGD system achieved availabilities of 100%, 97%, and 100% during July, August, and September, respectively. Corrosion encountered in the modular quencher sections necessitated repairs during the period, however, overall system availability remained high as a result of spare module capacity.

Initial operations of the Laramie River 2 FGD system of Basin Electric Power began during July. Laramie River 2 is rated at 570 MW (gross) and fires coal with an average sulfur content of 0.81%. The limestone FGD system, which was supplied by Research-Cottrell, consists of five absorber modules and is preceeded by an ESP for primary particulate matter removal. Availability of the FGD system during the months of August and September exceeded 95%.

Big Rivers Electric reported that the Green 1 FGD system achieved availabilities of 98%, 95%, and 85% during the months of July, August, and September, respectively. The availability dropped slightly in September due to the replacement of the chevron mist eliminators in both modules. The Green 2 FGD system achieved availabilities of 96%, 97%, and 100% for the same three month period with only minor problems being encountered.

Plans for the installation of a Unit 2 at the Duck Creek Generating Station have been delayed as a result of current load projections and economic conditions. As a result, the utility has temporarily suspended requesting/evaluating bids for an FGD system.

Columbus and Southern Ohio Electric reported availabilities of 100%, 99%, and 94% for the Conesville 5 FGD system during the months of July, August, and September, respectively. Conesville 6 achieved availabilities of 99%, 99%, and 95% during the same three month period. Both units were removed from service on September 19 as a result of low power demand.

Deseret Generation and Transmission announced during the third quarter that Moon Lake 1 and 2 have been renamed. The units are now designated as Bonanza 1 and 2.

East Kentucky Power announced that plans for the installation of J. K. Smith 2 have been postponed indefinitely as a result of power demand not meeting utility projections. In addition, initial start-up of J. K. Smith 1 has been pushed back to August 1987.

A letter of intent was signed during the period by Kentucky Utilities with Babcock and Wilcox for the installation of a limestone FGD system to control SO_2 emissions from the planned Hancock 1. This new unit is to be rated at 708 MW (gross) and will fire coal with an average sulfur content of 3.50%. The FGD system is scheduled to begin initial operations in April 1989.

Plans for the installation of a Unit 2 at the Hancock Generating Station have been delayed and Kentucky Utilities has temporarily suspended requested/evaluating bids for the installation of an FGD system for SO_2 control. The unit, which is to be rated at 708 MW (gross), is currently scheduled for operation in 1994.

Nevada Power announced during the period that plans for Warner Valley 1 and 2 have been postponed indefinitely. Due to projected SO_2 emissions and the planned station location with respect to a Class I area in the state of Utah, the utility has been unable to obtain a permit from the Environmental Protection Agency. The units were to be rated at 295 MW (gross) and were slated for operation in June 1985 and June 1986, respectively.

Plans for the installation of Wisconsin Coal 1 by Northern States Power have been postponed indefinitely. The unit was to be rated at 670 MW (gross) and was slated for initial operations in 1981.

Pacific Power and Light has temporarily suspended requesting/evaluating bids for the installation of FGD systems at the planned Jim Bridger Units 1, 2, and 3 as a result of obtaining a modification in the compliance deadline for Unit 3. The units are to be rated at 550 MW (gross) each and are scheduled for operation in 1988, 1990, and 1986, respectively.

Construction began during the third quarter 1981 on the limestone FGD system being installed on Plains Escalante 1 of Plains Electric Generation and Transmission. This new unit will be rated at

233 MW (gross) and will fire coal with an average sulfur content of 0.80%. The FGD system, which is being supplied by Combustion Engineering, is slated for initial operation in December 1983.

Initial operations of the limestone FGD system installed on San Miguel 1 of San Miguel Electric began during August 1981 when one of the four absorber modules was placed in service. San Miguel 1 is rated at 400 MW (gross) and fires coal with an average sulfur content of 1.70%. The FGD system, which was supplied by Babcock and Wilcox, is preceeded by a cold-side ESP for primary particulate matter control. Initial reports indicate that boiler problems have limited operation of the FGD system.

Construction of the Seminole 1 limestone FGD system of Seminole Electric began during the period. The 620 MW (gross) new unit will fire coal with an average sulfur content of 2.75%. The FGD system is being supplied by Peabody Process Systems and will be preceeded by ESP's for primary particulate matter removal. Initial operation is scheduled for March 1983.

Initial operations of the American Air Filter limestone FGD system installed on Winyah 4 began in July when one module was placed in service. Winyah 4 is rated at 280 MW (gross) and fires coal with an average sulfur content of 1.70%. A fire in the second module two months prior to projected start-up has kept that module off line. Integrated operation of both modules is expected to begin in January or February 1982.

South Mississippi Electric Power reported availabilities of 100%, 100%, and 99% for the R. D. Morrow 1 FGD system during July, August, and September, respectively. The R. D. Morrow 2 FGD system achieved availabilities of 100%, 100%, and 98% during the same three month period. No major FGD related problems were encountered during the third quarter.

Southern Illinois Power has announced that plans for the installation of Marion 5 have been postponed indefinitely as a result of current load projections, economic conditions, and environmental concerns. The unit was to have been rated at 300 MW (gross) and was slated for operation in 1988.

The A. B. Brown 1 FGD system of Southern Indiana Gas and Electric achieved availabilities of 91%, 92%, and 98% during the months of July, August, and September, respectively. Some pump liner problems were noted during the three month period.

Construction of the lime/spray drying FGD system being installed on Holcomb 1 of Sunflower Electric began during the third quarter. Holcomb 1 is to be rated at 347 MW (gross) and will fire coal with an average sulfur content of 0.47%. The FGD system, which is being supplied by Joy Manufacturing/Niro Atomizer, is scheduled to begin initial operations in September 1983.

Initial operations of the sodium carbonate FGD system retrofitted on Naughton 3 of Utah Power and Light began in early September. Naughton 3 is rated at 330 MW (gross) and fires coal with an average sulfur content of 0.55%. The FGD system was supplied by the Air Correction Division, UOP and is preceeded by an ESP for primary particulate matter control. The FGD system is currently in the start up phase of operations and is not required to be in full service until the end of the year.

West Texas Utilities announced that a contract has been awarded to General Electric Environmental Services for the installation of a limestone FGD system to control SO_2 emissions from Oklaunion 1. This new unit will be rated at 720 MW (gross) and will fire coal with an average sulfur content of 0.34%. FGD system start-up is scheduled for December 1986.

REFERENCES

1. U.S. Department of Energy. Energy Information Administration. Office of Coal and Electric Power Statistics. Electric Power Statistics Division. Inventory of Power Plants in the United States, 1980 Annual. Publ. No. DOE/EIA-0095 (80).

2. Berman, Ira M. New Generating Capacity: When, Where, and by Whom. Power Engineering 85(4)72. April 1981.

SECTION 1
SUMMARY LIST OF FGD SYSTEMS

COMPANY NAME/ UNIT NAME	UNIT NO.	UNIT LOCATION		START-UP DATE	STATUS	REG CLASS
ALABAMA ELECTRIC						
TOMBIGBEE	2	LEROY	ALABAMA	9/78	1	B
TOMBIGBEE	3	LEROY	ALABAMA	6/79	1	B
ARIZONA ELECTRIC POWER						
APACHE	2	COCHISE	ARIZONA	8/78	1	D
APACHE	3	COCHISE	ARIZONA	6/79	1	D
ARIZONA PUBLIC SERVICE						
CHOLLA	1	JOSEPH CITY	ARIZONA	10/73	1	C
CHOLLA	2	JOSEPH CITY	ARIZONA	4/78	1	C
CHOLLA	4	JOSEPH CITY	ARIZONA	3/81	1	C
FOUR CORNERS	1	FARMINGTON	NEW MEXICO	11/79	1	C
FOUR CORNERS	2	FARMINGTON	NEW MEXICO	11/79	1	C
FOUR CORNERS	3	FARMINGTON	NEW MEXICO	11/79	1	C
FOUR CORNERS	4	FARMINGTON	NEW MEXICO	12/84	2	C
FOUR CORNERS	5	FARMINGTON	NEW MEXICO	12/84	2	C
ASSOCIATED ELECTRIC						
THOMAS HILL	3	MOBERLY	MISSOURI	1/82	2	A
ATLANTIC CITY ELECTRIC						
CUMBERLAND	1	MILLVILLE	NEW JERSEY	1/88	6	C
BASIN ELECTRIC POWER						
ANTELOPE VALLEY	1	BEULAH	NORTH DAKOTA	10/83	2	D
ANTELOPE VALLEY	2	BEULAH	NORTH DAKOTA	10/85	2	C
LARAMIE RIVER	1	WHEATLAND	WYOMING	7/80	1	C
LARAMIE RIVER	2	WHEATLAND	WYOMING	7/81	1	C
LARAMIE RIVER	3	WHEATLAND	WYOMING	11/82	2	C
BIG RIVERS ELECTRIC						
D.B. WILSON	1	CENTERTOWN	KENTUCKY	7/84	2	A
D.B. WILSON	2	CENTERTOWN	KENTUCKY	0/86	3	A
GREEN	1	SEBREE	KENTUCKY	12/79	1	B
GREEN	2	SEBREE	KENTUCKY	11/80	1	B
CAJUN ELECTRIC POWER						
CHICOT	1	COUSHATTA	LOUISIANA	0/86	6	A
CHICOT	2	COUSHATTA	LOUISIANA	0/88	6	A
CHICOT	3	COUSHATTA	LOUISIANA	0/92	6	A
CHICOT	4	COUSHATTA	LOUISIANA	0/94	6	A
OXBOW	1	DE SOTO PARISH	LOUISIANA	0/85	5	A
OXBOW	2	COSHATTA	LOUISIANA	0/85	6	A
CENTRAL ILLINOIS LIGHT						
DUCK CREEK	1	CANTON	ILLINOIS	7/76	1	B
DUCK CREEK	2	CANTON	ILLINOIS	1/87	6	A
CENTRAL ILLINOIS PUBLIC SERV						
NEWTON	1	NEWTON	ILLINOIS	9/79	1	B
CENTRAL MAINE POWER						
SEARS ISLAND	1	PENOBSCOT BAY	MAINE	11/89	6	A

1. OPERATIONAL UNITS
2. UNITS UNDER CONSTRUCTION
3. PLANNED - CONTRACT AWARDED
4. PLANNED - LETTER OF INTENT SIGNED
5. PLANNED - REQUESTING/EVALUATING BIDS
6. PLANNED - CONSIDERING ONLY FGD SYSTEMS
7. PLANNED - CONSIDERING FGD SYSTEMS; ALSO ALTERNATIVE METHODS

A. FEDERAL NSPS(6/79)
B. FEDERAL NSPS(12/71)
C. STANDARD(S) MORE STRINGENT THAN NSPS(6/79)
D. STANDARD(S) MORE STRINGENT THAN NSPS(12/71) BUT NOT MORE STRINGENT THAN NSPS(6/79)
E. STANDARD(S) EQUAL TO OR LESS STRINGENT THAN NSPS(12/71)

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COMPANY NAME/ UNIT NAME	UNIT NO.	UNIT LOCATION		START-UP DATE	STATUS	REG CLASS
CENTRAL POWER & LIGHT						
COLETO CREEK	2	FANNIN	TEXAS	9/92	6	A
CINCINNATI GAS & ELECTRIC						
EAST BEND	1	RABBITHASH	KENTUCKY	0/88	6	
EAST BEND	2	RABBITHASH	KENTUCKY	3/81	1	B
COLORADO UTE ELECTRIC						
CRAIG	1	CRAIG	COLORADO	10/80	1	D
CRAIG	2	CRAIG	COLORADO	12/79	1	D
CRAIG	3	CRAIG	COLORADO	4/83	2	D
COLUMBUS & SOUTHERN OHIO ELEC						
CONESVILLE	5	CONESVILLE	OHIO	1/77	1	D
CONESVILLE	6	CONESVILLE	OHIO	6/78	1	D
POSTON	5	NELSONVILLE	OHIO	8/86	6	D
POSTON	6	NELSONVILLE	OHIO	0/89	6	D
COMMONWEALTH EDISON						
POWERTON	51	PEKIN	ILLINOIS	4/80	1	E
COOPERATIVE POWER ASSOCIATION						
COAL CREEK	1	UNDERWOOD	NORTH DAKOTA	7/79	1	B
COAL CREEK	2	UNDERWOOD	NORTH DAKOTA	7/80	1	B
DELMARVA POWER & LIGHT						
DELAWARE CITY	1	DELAWARE CITY	DELAWARE	5/80	1	E
DELAWARE CITY	2	DELAWARE CITY	DELAWARE	5/80	1	E
DELAWARE CITY	3	DELAWARE CITY	DELAWARE	5/80	1	E
VIENNA	9	VIENNA	MARYLAND	5/88	6	A
DESERET GEN & TRANS						
BONANZA	1	VERNAL	UTAH	9/84	2	A
BONANZA	2	VERNAL	UTAH	0/88	5	A
DUQUESNE LIGHT						
ELRAMA	1-4	ELRAMA	PENNSYLVANIA	10/75	1	D
PHILLIPS	1-6	SOUTH HEIGHT	PENNSYLVANIA	7/73	1	D
EAST KENTUCKY POWER						
J.K. SMITH	1	WINCHESTER	KENTUCKY	8/87	4	A
SPURLOCK	2	MAYSVILLE	KENTUCKY	4/83	2	B
FLORIDA POWER & LIGHT						
MARTIN	3	MARTIN COUNTY	FLORIDA	0/87	6	A
MARTIN	4	MARTIN COUNTY	FLORIDA	0/89	6	A
GENERAL PUBLIC UTILITIES						
COAL	1	UNDECIDED	UNDECIDED	5/91	5	A
COAL	2	UNDECIDED	UNDECIDED	5/93	6	A
COAL	3	UNDECIDED	UNDECIDED	5/95	6	A
COAL	4	UNDECIDED	UNDECIDED	5/96	6	A
SEWARD	7	EAST WHEATFIELD	PENNSYLVANIA	5/89	5	A

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COMPANY NAME/ UNIT NAME	UNIT NO.	UNIT LOCATION		START-UP DATE	STATUS	REG CLASS
GRAND HAVEN BRD OF LIGHT & PWR						
J.B. SIMS	3	GRAND HAVEN	MICHIGAN	1/83	2	A
HOOSIER ENERGY						
MEROM	1	MEROM	INDIANA	5/82	2	B
MEROM	2	MEROM	INDIANA	11/81	2	B
HOUSTON LIGHTING & POWER						
LIMESTONE	1	JEWETT	TEXAS	12/86	3	A
LIMESTONE	2	JEWETT	TEXAS	12/87	3	A
W.A. PARISH	8	BOOTH	TEXAS	11/82	2	A
INDIANAPOLIS POWER & LIGHT						
PATRIOT	1	PATRIOT	INDIANA	0/87	6	C
PATRIOT	2	PATRIOT	INDIANA	0/ 0	6	C
PATRIOT	3	PATRIOT	INDIANA	0/ 0	6	C
PETERSBURG	3	PETERSBURG	INDIANA	12/77	1	B
PETERSBURG	4	PETERSBURG	INDIANA	10/84	2	B
IOWA ELECTRIC LIGHT & PWR						
GUTHRIE CO.	1	PANORA	IOWA	11/87	4	A
JACKSONVILLE ELEC AUTHORITY						
ST.JOHNS RIVER PWR PARK	1	EAST PORT SITE	FLORIDA	12/85	5	A
ST.JOHNS RIVER PWR PARK	2	EAST PORT SITE	FLORIDA	6/87	5	A
KANSAS CITY POWER & LIGHT						
HAWTHORN	3	KANSAS CITY	MISSOURI	11/72	1	D
HAWTHORN	4	KANSAS CITY	MISSOURI	8/72	1	D
LA CYGNE	1	LA CYGNE	KANSAS	2/73	1	E
KANSAS POWER & LIGHT						
JEFFREY	1	WAMEGO	KANSAS	8/78	1	D
JEFFREY	2	WAMEGO	KANSAS	1/80	1	D
LAWRENCE	4	LAWRENCE	KANSAS	1/77	1	D
LAWRENCE	5	LAWRENCE	KANSAS	4/78	1	D
KENTUCKY UTILITIES						
GREEN RIVER	1-3	CENTRAL CITY	KENTUCKY	9/75	1	E
HANCOCK	1	HAWESVILLE	KENTUCKY	4/89	4	A
HANCOCK	2	HAWESVILLE	KENTUCKY	4/94	6	A
LAKELAND UTILITIES						
MCINTOSH	3	LAKELAND	FLORIDA	1/82	2	A
LANSING BOARD OF WATER & LIGHT						
ERICKSON	2	DELTA TOWNSHIP	MICHIGAN	1/87	6	C
LOS ANGELES DEPT OF WTR & PWR						
INTERMOUNTAIN	1	DELTA	UTAH	0/86	6	A
INTERMOUNTAIN	2	DELTA	UTAH	0/87	6	A
INTERMOUNTAIN	3	DELTA	UTAH	0/88	6	A
INTERMOUNTAIN	4	DELTA	UTAH	0/89	6	A

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COMPANY NAME/ UNIT NAME	UNIT NO.	UNIT LOCATION		START-UP DATE	STATUS	REG CLASS
LOUISVILLE GAS & ELECTRIC						
CANE RUN	4	LOUISVILLE	KENTUCKY	8/76	1	D
CANE RUN	5	LOUISVILLE	KENTUCKY	12/77	1	D
CANE RUN	6	LOUISVILLE	KENTUCKY	4/79	1	D
MILL CREEK	1	LOUISVILLE	KENTUCKY	12/80	1	E
MILL CREEK	2	LOUISVILLE	KENTUCKY	12/81	2	E
MILL CREEK	3	LOUISVILLE	KENTUCKY	8/78	1	D
MILL CREEK	4	LOUISVILLE	KENTUCKY	6/82	2	B
PADDY'S RUN	6	LOUISVILLE	KENTUCKY	4/73	1	E
TRIMBLE COUNTY	1	BEDFORD	KENTUCKY	7/85	5	C
TRIMBLE COUNTY	2	BEDFORD	KENTUCKY	7/89	5	C
LOWER COLORADO RIVER AUTH						
FAYETTE POWER PROJECT	3	LA GRANGE	TEXAS	0/88	6	A
MARQUETTE BOARD OF LIGHT & PWR						
SHIRAS	3	MARQUETTE	MICHIGAN	9/82	2	A
MICHIGAN SO CENTRAL PWR AGENCY						
PROJECT	1	LITCHFIELD	MICHIGAN	6/82	2	A
MIDDLE SOUTH UTILITIES						
ARKANSAS LIGNITE	5		ARKANSAS	0/90	4	A
ARKANSAS LIGNITE	6		ARKANSAS	0/92	4	A
UNASSIGNED	1		LOUISIANA	0/89	4	A
UNASSIGNED	2		LOUISIANA	0/93	4	A
WILTON	1	CONVENT	LOUISIANA	0/88	4	A
WILTON	2	CONVENT	LOUISIANA	0/91	4	A
MINNESOTA POWER & LIGHT						
CLAY BOSWELL	4	COHASSET	MINNESOTA	4/80	1	A
MINNKOTA POWER						
MILTON R. YOUNG	2	CENTER	NORTH DAKOTA	9/77	1	D
MONONGAHELA POWER						
PLEASANTS	1	WILLOW ISLAND	WEST VIRGINIA	3/79	1	B
PLEASANTS	2	WILLOW ISLAND	WEST VIRGINIA	10/80	1	B
MONTANA POWER						
COLSTRIP	1	COLSTRIP	MONTANA	9/75	1	B
COLSTRIP	2	COLSTRIP	MONTANA	5/76	1	B
COLSTRIP	3	COLSTRIP	MONTANA	10/83	2	C
COLSTRIP	4	COLSTRIP	MONTANA	0/84	2	C
MONTANA-DAKOTA UTILITIES						
COYOTE	1	BEULAH	NORTH DAKOTA	4/81	1	E
MUSCATINE POWER & WATER						
MUSCATINE	9	MUSCATINE	IOWA	9/82	2	B
NEBRASKA PUBLIC POWER DISTRICT						
FOSSIL III	1	SARGENT	NEBRASKA	3/92	6	A

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B. FEDERAL NSPS(12/71)
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SECTION 1
SUMMARY LIST OF FGD SYSTEMS

COMPANY NAME/ UNIT NAME	UNIT NO.	UNIT LOCATION		START-UP DATE	STATUS	REG CLASS
NEVADA POWER						
HARRY ALLEN	1	LAS VEGAS	NEVADA	6/86	6	A
HARRY ALLEN	2	LAS VEGAS	NEVADA	6/87	6	A
HARRY ALLEN	3	LAS VEGAS	NEVADA	6/88	6	A
HARRY ALLEN	4	LAS VEGAS	NEVADA	6/89	6	A
REID GARDNER	1	MOAPA	NEVADA	3/74	1	B
REID GARDNER	2	MOAPA	NEVADA	4/74	1	B
REID GARDNER	3	MOAPA	NEVADA	6/76	1	B
REID GARDNER	4	MOAPA	NEVADA	4/83	4	A
NEW YORK STATE ELEC & GAS						
SOMERSET	1	SOMERSET	NEW YORK	6/84	4	E
NIAGARA MOHAWK POWER						
CHARLES R. HUNTLEY	66	BUFFALO	NEW YORK	4/82	2	E
NORTHERN INDIANA PUB SERVICE						
DEAN H. MITCHELL	11	GARY	INDIANA	7/76	1	E
SCHAHFER	17	WHEATFIELD	INDIANA	6/83	2	A
SCHAHFER	18	WHEATFIELD	INDIANA	6/85	3	A
NORTHERN STATES POWER						
METRO COAL	1	UNDECIDED	UNDECIDED	0/90	6	A
RIVERSIDE	6-7	MINNEAPOLIS	MINNESOTA	11/80	1	E
SHERBURNE	1	BECKER	MINNESOTA	3/76	1	D
SHERBURNE	2	BECKER	MINNESOTA	3/77	1	D
SHERBURNE	3	BECKER	MINNESOTA	0/85	6	C
PACIFIC GAS & ELECTRIC						
MONTEZUMA	1	COLLINSVILLE	CALIFORNIA	6/93	6	C
MONTEZUMA	2	COLLINSVILLE	CALIFORNIA	6/94	6	C
PACIFIC POWER & LIGHT						
JIM BRIDGER	1	ROCK SPRINGS	WYOMING	0/88	6	A
JIM BRIDGER	2	ROCK SPRINGS	WYOMING	0/90	6	A
JIM BRIDGER	2A	ROCK SPRINGS	WYOMING	1/82	2	A
JIM BRIDGER	3	ROCK SPRINGS	WYOMING	0/86	6	A
JIM BRIDGER	4	ROCK SPRINGS	WYOMING	9/79	1	D
PENNSYLVANIA POWER						
BRUCE MANSFIELD	1	SHIPPINGPORT	PENNSYLVANIA	12/75	1	D
BRUCE MANSFIELD	2	SHIPPINGPORT	PENNSYLVANIA	7/77	1	D
BRUCE MANSFIELD	3	SHIPPINGPORT	PENNSYLVANIA	6/80	1	D
PHILADELPHIA ELECTRIC						
CROMBY	1	PHOENIXVILLE	PENNSYLVANIA	5/83	2	D
EDDYSTONE	1	EDDYSTONE	PENNSYLVANIA	12/82	2	D
EDDYSTONE	2	EDDYSTONE	PENNSYLVANIA	12/82	2	D
PLAINS ELECTRIC G & T						
PLAINS ESCALANTE	1	PREWITT	NEW MEXICO	12/83	2	B
PLATTE RIVER POWER AUTHORITY						
RAWHIDE	1	FT. COLLINS	COLORADO	12/83	3	C

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PUBLIC SERVICE INDIANA						
GIBSON	5	PRINCETON	INDIANA	8/82	2	B
PUBLIC SERVICE OF NEW MEXICO						
SAN JUAN	1	WATERFLOW	NEW MEXICO	4/78	1	C
SAN JUAN	2	WATERFLOW	NEW MEXICO	8/78	1	C
SAN JUAN	3	WATERFLOW	NEW MEXICO	12/79	1	C
SAN JUAN	4	WATERFLOW	NEW MEXICO	6/82	2	C
PWR AUTHORITY OF STATE OF NY						
FOSSIL		NEW YORK	NEW YORK	4/87	6	C
SALT RIVER PROJECT						
CORONADO	1	ST. JOHNS	ARIZONA	11/79	1	D
CORONADO	2	ST. JOHNS	ARIZONA	7/80	1	D
CORONADO	3	ST. JOHNS	ARIZONA	0/89	6	A
SAN MIGUEL ELECTRIC						
SAN MIGUEL	1	SAN MIGUEL	TEXAS	8/81	1	B
SEMINOLE ELECTRIC						
SEMINOLE	1	PALATKA	FLORIDA	3/83	2	A
SEMINOLE	2	PALATKA	FLORIDA	1/85	3	A
SIERRA PACIFIC POWER						
VALMY	2	VALMY	NEVADA	8/84	7	A
SIKESTON BRD OF MUNICIPAL UTIL						
SIKESTON	1	SIKESTON	MISSOURI	6/81	1	B
SOUTH CAROLINA PUBLIC SERVICE						
CROSS	1	CROSS	SOUTH CAROLINA	5/88	3	A
CROSS	2	CROSS	SOUTH CAROLINA	11/83	2	A
WINYAH	2	GEORGETOWN	SOUTH CAROLINA	7/77	1	B
WINYAH	3	GEORGETOWN	SOUTH CAROLINA	5/80	1	B
WINYAH	4	GEORGETOWN	SOUTH CAROLINA	7/81	1	A
SOUTH MISSISSIPPI ELEC PWR						
R.D. MORROW, SR.	1	HATTIESBURG	MISSISSIPPI	8/78	1	B
R.D. MORROW, SR.	2	HATTIESBURG	MISSISSIPPI	6/79	1	B
SOUTHERN ILLINOIS POWER						
MARION	4	MARION	ILLINOIS	5/79	1	B
SOUTHERN INDIANA GAS & ELEC						
A.B. BROWN	1	WEST FRANKLIN	INDIANA	3/79	1	B
A.B. BROWN	2	WEST FRANKLIN	INDIANA	1/85	5	A
SOUTHWESTERN ELECTRIC POWER						
DOLET HILLS	1	MANSFIELD	LOUISIANA	3/86	3	A
DOLET HILLS	2	MANSFIELD	LOUISIANA	0/88	6	A
HENRY W. PIRKEY	1	HALLSVILLE	TEXAS	12/84	3	B
SOYLAND POWER						
SOYLAND	1	UNDECIDED	ILLINOIS	6/87	6	A

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SPRINGFIELD CITY UTILITIES						
SOUTHWEST	1	SPRINGFIELD	MISSOURI	4/77	1	B
SPRINGFIELD WATER, LIGHT & PWR						
DALLMAN	3	SPRINGFIELD	ILLINOIS	12/80	1	B
ST. JOE ZINC						
G.F. WEATON	1	MONACA	PENNSYLVANIA	11/79	1	B
SUNFLOWER ELECTRIC						
HOLCOMB	1	HOLCOMB	KANSAS	9/83	2	A
TAMPA ELECTRIC						
BIG BEND	4	TAMPA	FLORIDA	3/85	3	A
TENNESSEE VALLEY AUTHORITY						
PARADISE	1	PARADISE	KENTUCKY	3/82	2	E
PARADISE	2	PARADISE	KENTUCKY	6/82	2	E
SHAWNEE	10A	PADUCAH	KENTUCKY	4/72	1	E
SHAWNEE	10B	PADUCAH	KENTUCKY	4/72	1	E
WIDOWS CREEK	7	BRIDGEPORT	ALABAMA	3/81	1	E
WIDOWS CREEK	8	BRIDGEPORT	ALABAMA	5/77	1	E
TEXAS MUNICIPAL POWER AGENCY						
GIBBONS CREEK	1	CARLOS	TEXAS	10/82	2	A
TEXAS POWER & LIGHT						
SANDOW	4	ROCKDALE	TEXAS	12/80	1	B
TWIN OAKS	1	BREMOND	TEXAS	8/85	3	A
TWIN OAKS	2	BREMOND	TEXAS	8/87	3	A
TEXAS UTILITIES						
FOREST GROVE	1	ATHENS	TEXAS	0/87	5	A
MARTIN LAKE	1	TATUM	TEXAS	4/77	1	B
MARTIN LAKE	2	TATUM	TEXAS	5/78	1	B
MARTIN LAKE	3	TATUM	TEXAS	2/79	1	B
MARTIN LAKE	4	TATUM	TEXAS	0/89	3	A
MILL CREEK	1	HENDERSON	TEXAS	0/87	6	A
MILL CREEK	2	HENDERSON	TEXAS	0/88	6	A
MONTICELLO	3	MT. PLEASANT	TEXAS	5/78	1	B
TUCSON ELECTRIC POWER						
SPRINGERVILLE	1	SPRINGERVILLE	ARIZONA	2/85	3	B
SPRINGERVILLE	2	SPRINGERVILLE	ARIZONA	3/87	3	B
UNITED POWER ASSOCIATION						
STANTON	1A	STANTON	NORTH DAKOTA	6/82	2	A
UTAH POWER & LIGHT						
HUNTER	1	CASTLE DALE	UTAH	5/79	1	B
HUNTER	2	CASTLE DALE	UTAH	6/80	1	B
HUNTER	3	CASTLE DALE	UTAH	6/83	2	A
HUNTER	4	CASTLE DALE	UTAH	6/85	2	A
HUNTINGTON	1	PRICE	UTAH	5/78	1	B
NAUGHTON	3	KEMMERER	WYOMING	9/81	1	C

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WASHINGTON WATER POWER						
CRESTON COAL	1	CRESTON	WASHINGTON	0/87	6	A
CRESTON COAL	2	CRESTON	WASHINGTON	0/87	6	C
CRESTON COAL	3	CRESTON	WASHINGTON	0/87	6	C
CRESTON COAL	4	CRESTON	WASHINGTON	0/87	6	
WEST PENN POWER						
MITCHELL	33	COURTNEY	PENNSYLVANIA	8/82	2	C
WEST TEXAS UTILITIES						
OKLAUNION	1	OKLAUNION	TEXAS	12/86	3	A
OKLAUNION	2	OKLAUNION	TEXAS	0/90	6	A

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SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
ALABAMA ELECTRIC TOMBIGBEE 2 NEW 255 MW (GROSS) 179 MW (ESC) COAL 1.15 %S BITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: 3.1% STATUS 1 STARTUP 9/78	TOMBIGBEE 2 OF ALABAMA ELECTRIC COOP IS A PULVERIZED COAL BOILER LOCATED IN LEROY, ALABAMA. THE BOILER GENERATES A MAXIMUM FLUE GAS FLOW OF 953,000 ACFM AND BURNS BITUMINOUS COAL WITH AN AVERAGE SULFUR CONTENT OF 1.15% AND AN AVERAGE HEAT CONTENT OF 11,500 BTU/LB. THE UNIT SO2 EMMISSION LIMITATION VALUE IS 1.2 LB/MMBTU. PRIMARY PARTICULATE MATTER CONTROL IS PROVIDED BY A HOT SIDE ESP. THE SO2 REMOVAL EQUIPMENT CONSISTS OF TWO SPRAY TOWERS SUPPLIED BY PEABODY PROCESS SYSTEMS WHICH UTILIZE A LIMESTONE REAGENT. A CHEVRON MIST ELIMINATOR IS INCLUDED FOR EACH TOWER AND THE FLUE GAS IS REHEATED WITH BYPASSED GAS BEFORE BEING VENTED TO A 400 FOOT ACID-BRICK LINED STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP MODE AND SPENT ABSORBENT IS DISPOSED OF IN AN ON-SITE LINED POND.
ALABAMA ELECTRIC TOMBIGBEE 3 NEW 255 MW (GROSS) 179 MW (ESC) COAL 1.15 %S BITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: 3.1% STATUS 1 STARTUP 6/79	TOMBIGBEE 3 OF ALABAMA ELECTRIC COOP IS A PULVERIZED COAL BOILER LOCATED IN LEROY, ALABAMA. THE BOILER GENERATES A MAXIMUM FLUE GAS FLOW OF 953,000 ACFM AND BURNS BITUMINOUS COAL WITH AN AVERAGE SULFUR CONTENT OF 1.15% AND AN AVERAGE HEAT CONTENT OF 11,500 BTU/LB. THE UNIT SO2 EMISSION LIMITATION VALUE IS 1.2 LB/MMBTU. PRIMARY PARTICULATE CONTROL IS PROVIDED BY A HOT SIDE ESP. THE SO2 REMOVAL EQUIPMENT CONSISTS OF TWO SPRAY TOWERS SUPPLIED BY PEABODY PROCESS SYSTEMS WHICH UTILIZE A LIMESTONE REAGENT. A CHEVRON MIST ELIMINATOR IS INCLUDED IN EACH TOWER, AND THE FLUE GAS IS REHEATED WITH BYPASSED GAS BEFORE BEING VENTED TO A 400 FOOT ACID BRICK LINED STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP MODE, AND SPENT ABSORBENT IS DISPOSED IN AN ON-SITE LINED POND.
ARIZONA ELECTRIC POWER APACHE 2 NEW 195 MW (GROSS) 98 MW (ESC) COAL .50 %S BITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 4.1% STATUS 1 STARTUP 8/78	APACHE 2 OF ARIZONA ELECTRIC POWER COOP IS LOCATED IN COCHISE, ARIZONA AND IS A DRY BOTTOM PULVERIZED COAL FIRED UNIT WITH A FLUE GAS FLOW OF 735,000 ACFM. BITUMINOUS COAL WITH A HEATING VALUE OF 10,000 BTU/LB, A SULFUR CONTENT OF 0.55% AND AN ASH CONTENT OF 15% IS THE FUEL USED FOR THIS UNIT. PARTICULATE CONTROL IS EFFECTED BY A HOT SIDE ESP. HALF THE FLUE GAS PASSES THROUGH TWO PACKED TOWERS EMPLOYING LIMESTONE ABSORBENT AND HAVING A DESIGN SO2 REMOVAL OF 85% WERE SUPPLIED BY RESEARCH-COTTRELL. MIST ELIMINATION IS PROVIDED BY CHEVRON TYPE ELIMINATORS. NO REHEAT IS EMPLOYED. A 400 FT COLE BRAND CXL2000 LINED STACK IS IN USE. THE SYSTEM OPERATES IN AN OPEN WATER LOOP MODE AND WASTE MATERIAL IS DISPOSED OF IN OFF-SITE SLUDGE PONDS. OPERATIONS COMMENCED IN AUGUST 1978.
ARIZONA ELECTRIC POWER APACHE 3 NEW 195 MW (GROSS) 98 MW (ESC) COAL .50 %S BITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 4.1% STATUS 1 STARTUP 6/79	APACHE 3 OF ARIZONA ELECTRIC POWER COOP IS A DRY BOTTOM, PULVERIZED COAL FIRED UNIT IN COCHISE, ARIZONA. LOW (0.55%) SULFUR BITUMINOUS COAL WITH AN AVERAGE HEATING VALUE OF 10,000 BTU/LB PRODUCES A MAXIMUM FLUE GAS FLOW OF 735,000 ACFM. HALF OF THE FLUE GAS PASSES THROUGH A HOT SIDE ESP TO TWO RESEARCH COTTRELL PACKED TOWERS, WHERE LIMESTONE IS USED TO REMOVE 85% OF THE SO2. THE GAS EXITS A HORIZONTAL CHEVRON MIST ELIMINATOR INTO ITS OWN CEILCOTE LINED FLUE IN THE 400 FOOT STACK IT SHARES WITH UNIT 2. THE FGD, WHICH HAS BEEN OPERATIONAL SINCE JUNE OF 1979, USES NO REHEAT. THE SYSTEM OPERATES IN AN OPEN WATER LOOP AND SLUDGE IS DISPOSED OF IN TWO OFF SITE LINED PONDS WITH 20 YEARS' EXPECTED LIFESPAN. TWO ADDITIONAL PONDS ARE PLANNED, WHICH WOULD ADD ANOTHER 20 YEARS' CAPACITY.
ARIZONA PUBLIC SERVICE CHOLLA 1 RETROFIT 119 MW (GROSS) 119 MW (ESC) COAL .50 %S BITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 3.4% STATUS 1 STARTUP 10/73	ARIZONA PUBLIC SERVICE'S CHOLLA 1 IS LOCATED IN JOSEPH CITY, ARIZONA AND IS A TANGENTIALLY FIRED, WET BOTTOM PULVERIZED COAL UNIT. IT IS FUELED BY BITUMINOUS COAL THAT HAS A SULFUR CONTENT OF 0.5% AND A HEATING VALUE OF 10,150 BTU/LB. PARTICULATE MATTER IS CONTROLLED BY TWO FLOODED DISC SCRUBBERS. THE FGD SYSTEM BEGAN IN OCTOBER, 1973 AND IS NOW OPERATIONAL. SO2 IS CONTROLLED BY ONE TOWER WITH MUNTERS PACKING EMPLOYING A LIMESTONE ABSORBENT. THE UNIT WAS SUPPLIED BY RESEARCH COTTRELL AND HAS A DESIGN REMOVAL OF 92%. CHEVRON MIST ELIMINATORS ARE LOCATED PRIOR TO AN IN-LINE STEAM REHEAT SYSTEM. THE TREATED FLUE GAS IS VENTED TO A 256 FT ACID BRICK LINED STACK. THE FGD SYSTEM OPERATES IN AN OPEN WATER LOOP MODE AND THE UNTREATED WASTE IS DISPOSED OF IN AN ON-SITE UNLINED POND.
ARIZONA PUBLIC SERVICE CHOLLA 2 NEW 264 MW (GROSS) 264 MW (ESC) COAL .50 %S BITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 4/78	CHOLLA 2 OF ARIZONA PUBLIC SERVICE IS LOCATED IN JOSEPH CITY, ARIZONA. THE BOILER BURNS PULVERIZED BITUMINOUS COAL (0.5% S, 10,150 BTU/LB). MECHANICAL COLLECTORS PROVIDE PRIMARY PARTICULATE CONTROL. FOUR PARALLEL FLOODED DISC AND PACKED TOWER SO2 ABSORBER TRAINS (THREE ARE REQUIRED FOR FULL LOAD) REMOVE THE FLUE GAS SO2. THE DESIGN SO2 REMOVAL FOR THE SYSTEM, WHICH BEGAN OPERATIONS IN APRIL, 1978, IS 75%. THE CLEANED GAS PASSES THROUGH AN IN-LINE STEAM REHEATER INTO AN ACID BRICK LINED STACK. THE OPEN WATER LOOP SYSTEM DEPOSITS ITS SLUDGE INTO A FLY ASH POND.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
ARIZONA PUBLIC SERVICE CHOLLA 4 NEW 375 MW (GROSS) 126 MW (ESC) COAL .50 %S LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 3/81	CHOLLA 4 OF ARIZONA PUBLIC SERVICE IS LOCATED IN JOSEPH CITY, ARIZONA. THE PULVERIZED COAL (0.5% S, 10150 BTU/LB) FIRED BOILER EXHAUSTS FLUE GAS THROUGH AN ESP TO A DOUBLE LOOP COMBINATION TOWER (RESEARCH-COTTRELL DESIGN) WHICH TREATS 36% OF THE GAS WITH LIMESTONE. OPERATIONS COMMENCED IN MARCH, 1981.
ARIZONA PUBLIC SERVICE FOUR CORNERS 1 RETROFIT 175 MW (GROSS) 175 MW (ESC) COAL .75 %S SUBBITUMINOUS LIME/ALKALINE FLYASH GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 11/79	ARIZONA PUBLIC SERVICE HAS UPGRADED THE OPERATIONAL PARTICULATE SCRUBBERS AT FOUR CORNERS 1, 2, AND 3 IN FARMINGTON, NEW MEXICO TO HANDLE ADDITIONAL SO2 REMOVAL. INITIALLY, THE FRONT FIRED, DRY BOTTOM, PULVERIZED COAL (SUBBITUMINOUS, 0.75% S, 8650 BTU/LB) UNITS 1 AND 2 SUPPLY 814,000 ACFM EACH INTO 2 GEESI VENTURI SCRUBBERS PER UNIT FOR PRIMARY PARTICLE CONTROL AND APPROXIMATELY 30% SO2 REMOVAL USING ALKALINE FLY ASH. THE DESIGN SO2 REMOVAL EFFICIENCY SINCE THE CONVERSION TO LIME AND ALKALINE FLY ASH SCRUBBING IS 67.5%. OPERATIONS COMMENCED IN NOVEMBER, 1979.
ARIZONA PUBLIC SERVICE FOUR CORNERS 2 RETROFIT 175 MW (GROSS) 175 MW (ESC) COAL .75 %S SUBBITUMINOUS LIME/ALKALINE FLYASH GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 11/79	ARIZONA PUBLIC SERVICE HAS UPGRADED THE OPERATIONAL PARTICULATE SCRUBBERS AT FOUR CORNERS 1,2, AND 3 IN FARMINGTON, NEW MEXICO TO HANDLE ADDITIONAL SO2 REMOVAL. INITIALLY, THE FRONT FIRED, DRY BOTTOM, PULVERIZED COAL (SUBBITUMINOUS, 0.75% S, 8650 BTU/LB) UNITS 1 AND 2 SUPPLY 814,000 ACFM EACH INTO 2 GEESI VENTURI SCRUBBERS PER UNIT FOR PRIMARY PARTICLE CONTROL AND APPROXIMATELY 30% SO2 REMOVAL USING ALKALINE FLY ASH. THE DESIGN SO2 REMOVAL EFFICIENCY SINCE THE CONVERSION TO LIME AND ALKALINE FLY ASH SCRUBBING IS 67.5%. OPERATIONS COMMENCED IN NOVEMBER, 1979.
ARIZONA PUBLIC SERVICE FOUR CORNERS 3 RETROFIT 229 MW (GROSS) 229 MW (ESC) COAL .75 %S SUBBITUMINOUS LIME/ALKALINE FLYASH GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 11/79	ARIZONA PUBLIC SERVICE HAS UPGRADED THE OPERATIONAL PARTICULATE SCRUBBERS AT FOUR CORNERS 1,2, AND 3 IN FARMINGTON, NEW MEXICO TO HANDLE ADDITIONAL SO2 REMOVAL. INITIALLY, THE FRONT FIRED, DRY BOTTOM, PULVERIZED COAL (SUBBITUMINOUS, 0.75% S, 8650 BTU/LB) UNIT 3 SUPPLIES 1,030,000 ACFM INTO 2 INTO 2 GEESI VENTURI SCRUBBERS PER UNIT FOR PRIMARY PARTICLE CONTROL LY 30% SO2 REMOVAL USING ALKALINE FLY ASH. THE DESIGN SO2 REMOVAL EFFICIENCY SINCE THE CONVERSION TO LIME AND ALKALINE FLY ASH SCRUBBING IS 67.5%. OPERATIONS COMMENCED IN NOVEMBER, 1979.
ARIZONA PUBLIC SERVICE FOUR CORNERS 4 RETROFIT 755 MW (GROSS) 755 MW (ESC) COAL .75 %S LIME UNITED ENGINEERS ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 12/84	ARIZONA PUBLIC SERVICE AWARDED A CONTRACT TO UNITED ENGINEERS FOR A LIME FGD SYSTEM TO BE RETROFITTED ONTO UNITS 4 AND 5 AT ITS FOUR CORNERS STATION IN FARMINGTON, NEW MEXICO. BASED ON THE PROTOTYPE HORIZONTAL SCRUBBING PROGRAM CONDUCTED BY THE UTILITY, A HORIZONTAL SYSTEM WAS CHOSEN TO CONTROL THE EMISSIONS FROM THESE COAL (0.75% S, 8650 BTU/LB) FIRED UNITS. THE PARTICULATE EMISSIONS ARE HANDLED BY AN ESP. START-UP IS EXPECTED IN DECEMBER 1984.
ARIZONA PUBLIC SERVICE FOUR CORNERS 5 RETROFIT 755 MW (GROSS) 755 MW (ESC) COAL .75 %S LIME UNITED ENGINEERS ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 12/84	ARIZONA PUBLIC SERVICE AWARDED A CONTRACT TO UNITED ENGINEERS FOR A LIME FGD SYSTEM TO BE RETROFITTED ONTO UNITS 4 AND 5 AT ITS FOUR CORNERS STATION IN FARMINGTON, NEW MEXICO. BASED ON THE PROTOTYPE HORIZONTAL SCRUBBING PROGRAM CONDUCTED BY THE UTILITY, A HORIZONTAL SYSTEM WAS CHOSEN TO CONTROL THE EMISSIONS FROM THESE COAL (0.75% S, 8650 BTU/LB) FIRED UNITS. THE PARTICULATE EMISSIONS ARE HANDLED BY AN ESP. START-UP IS EXPECTED IN DECEMBER 1984.

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UNIT IDENTIFICATION	ABSTRACT
ASSOCIATED ELECTRIC THOMAS HILL 3 NEW 730 MW (GROSS) 670 MW (ESC) COAL 4.80 %S LIMESTONE PULLMAN KELLOGG ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 1/82	THOMAS HILL 3 OF ASSOCIATED ELECTRIC COOP IS A PULVERIZED COAL (4.8% S, 9,700 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN MOBERLY, MISSOURI. TWO COLD SIDE ESP'S WILL PRECEDE THE FOUR 91.5% EFFICIENT PULLMAN KELLOGG HORIZONTAL WEIR FGD MODULES USING MAG-PROMOTED LIMESTONE AS THE ABSORBENT. THE CLEANED GAS WILL PASS THROUGH A VERTICAL CHEVRON MIST ELIMINATOR TO A 620 FOOT BRICK LINED STACK. REHEAT WILL BE ACCOMPLISHED BY BYPASS. DRY FIXATED SLUDGE WILL BE TRUCKED TO AN ACTIVE STRIP MINE. THE SYSTEM WILL USE A CLOSED WATER LOOP. THE FGD SYSTEM IS UNDER CONSTRUCTION AND START-UP IS EXPECTED IN JANUARY 1982.
ATLANTIC CITY ELECTRIC CUMBERLAND 1 NEW 330 MW (GROSS) 330 MW (ESC) COAL 3.25 %S BITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 1/88	CUMBERLAND 1 IS A PULVERIZED COAL (3.25% S) FIRED BOILER TO BE LOCATED IN MILVILLE, NEW JERSEY. THE UTILITY IS CONSIDERING AN FGD SYSTEM WITH A THROWAWAY PRODUCT FOR SO2 CONTROL. OPERATIONS ARE SCHEDULED TO BEGIN IN JANUARY 1988.
BASIN ELECTRIC POWER ANTELOPE VALLEY 1 NEW 440 MW (GROSS) 440 MW (ESC) COAL .68 %S LIGNITE LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 10/83	UNIT 1 OF BASIN ELECTRIC POWER COOP'S ANTELOPE VALLEY PLANT IS PRESENTLY UNDER CONSTRUCTION IN BEULAH, NORTH DAKOTA. THIS UNIT WILL BURN PULVERIZED COAL (0.68% S, 6600 BTU/LB LIGNITE) AND SUPPLY 2,055,000 ACFM TO A DRY LIME FGD SYSTEM SUPPLIED BY WESTERN PRECIPITATION. THE 62% EFFICIENT SYSTEM WILL CONSIST OF 5 NIRO ATOMIZER SPRAY DRYERS AND TWO BAGHOUSES. THE CLEANED GAS, ALONG WITH A 4% BYPASS REHEAT, WILL EXIT A 600 FOOT PVC LINED STACK. THE SYSTEM WILL USE A CLOSED WATER LOOP AND THE DRY POWDER WILL BE USED FOR LANDFILL IN A COAL MINE. START-UP IS EXPECTED IN OCTOBER 1983.
BASIN ELECTRIC POWER ANTELOPE VALLEY 2 NEW 440 MW (GROSS) 440 MW (ESC) COAL .68 %S LIGNITE LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 10/85	ANTELOPE VALLEY 2 OF BASIN ELECTRIC POWER COOP WILL BE LOCATED IN BEULAH, NORTH DAKOTA. JOY/NIRO HAS BEEN AWARDED A CONTRACT FOR THIS LIGNITE (0.68% S, 6600 BTU/LB) FIRED UNIT. THE UNIT WILL BE REQUIRED TO COMPLY WITH STATE EMISSIONS STANDARDS VIA BEST AVAILABLE CONTROL TECHNOLOGY. START-UP IS SCHEDULED FOR OCTOBER 1985.
BASIN ELECTRIC POWER LARAMIE RIVER 1 NEW 570 MW (GROSS) 570 MW (ESC) COAL .81 %S SUBBITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERG. CONSUMPTION: ****% STATUS 1 STARTUP 7/80	BASIN ELECTRIC POWER COOP'S LARAMIE RIVER 1 IS A PULVERIZED COAL (0.8% S, 8139 BTU/LB) FIRED UNIT LOCATED IN WHEATLAND, WYOMING. THE BOILER FEEDS 2,300,000 ACFM OF FLUE GAS THROUGH A COLD SIDE ESP TO FIVE RESEARCH COTTRELL LIMESTONE PACKED TOWER MODULES, WHICH REMOVE 90% OF THE SO2. THE CLEANED GAS EXITS FROM A VERTICAL CHEVRON MIST ELIMINATOR INTO A 600 FOOT ACID BRICK LINED STACK. NO REHEAT IS USED. THE FLYASH FIXATED SLUDGE IS DEWATERED TO 83% SOLIDS BEFORE BEING LANDFILLED, AND THE SYSTEM EMPLOYS A CLOSED WATER LOOP. OPERATIONS BEGAN ON JULY 1, 1980.
BASIN ELECTRIC POWER LARAMIE RIVER 2 NEW 570 MW (GROSS) 570 MW (ESC) COAL .81 %S SUBBITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 7/81	BASIN ELECTRIC POWER COOP'S LARAMIE RIVER 2 IS A NEW UNIT LOCATED IN WHEATLAND, WYOMING. THE PULVERIZED COAL (0.81% S, 8139 BTU/LB) FIRED BOILER FEEDS 2,300,000 ACFM OF FLUE GAS THROUGH A COLD SIDE ESP TO FIVE RESEARCH-COTTRELL LIMESTONE PACKED TOWER MODULES, WHICH REMOVE 90% OF THE SO2. THE CLEANED GAS EXITS FROM A VERTICAL CHEVRON MIST ELIMINATOR INTO A 600 FOOT ACID BRICK LINED STACK. NO REHEAT IS USED. THE FLYASH FIXATED SLUDGE IS DEWATERED TO 83% SOLIDS BEFORE BEING LANDFILLED, AND THE SYSTEM EMPLOYS A CLOSED WATER LOOP. START-UP TOOK PLACE IN JULY 1981.

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UNIT IDENTIFICATION	ABSTRACT
BASIN ELECTRIC POWER LARAMIE RIVER 3 NEW 570 MW (GROSS) 570 MW (ESC) COAL .54 %S SUBBITUMINOUS LIME/SPRAY DRYING BABCOCK & WILCOX ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 11/82	LARAMIE RIVER 3 OF BASIN ELECTRIC POWER COOP IS UNDER CONSTRUCTION IN WHEATLAND, WYOMING, AND WILL UTILIZE FOUR DRY LIME INJECTION MODULES, AND A COLD SIDE ESP. THE BOILER WILL FIRE PULVERIZED COAL (0.54% S, 8100 BTU/LB) AND WILL SUPPLY 2,800,000 ACFM OF FLUE GAS TO THE FGD SYSTEM, WHICH WILL REMOVE 85% OF THE SO2 BEFORE THE GAS EXITS THROUGH A 600 FOOT ACID BRICK LINED STACK. A 3% BYPASS WILL BE USED FOR REHEAT. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP, AND WILL LANDFILL THE DRY POWDER WASTE. OPERATIONS ARE SCHEDULED TO COMMENCE IN NOV. 1982.
BIG RIVERS ELECTRIC D.B. WILSON 1 NEW 440 MW (GROSS) 440 MW (ESC) COAL ***** %S BITUMINOUS LIMESTONE PULLMAN KELLOGG ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 7/84	BIG RIVERS ELECTRIC HAS PLANS FOR TWO NEW UNITS, D.B. WILSON 1 AND 2. THE PULVERIZED COAL FIRED BOILERS WILL HAVE A MW RATING OF 440 EACH. THE WET LIMESTONE FGD SYSTEM FOR UNIT 1 IS CURRENTLY UNDER CONSTRUCTION. START-UP IS SCHEDULED FOR JULY 1984.
BIG RIVERS ELECTRIC D.B. WILSON 2 NEW 440 MW (GROSS) 440 MW (ESC) COAL ***** %S BITUMINOUS LIMESTONE PULLMAN KELLOGG ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 0/86	BIG RIVERS ELECTRIC HAS PLANS FOR TWO NEW UNITS, D.B. WILSON 1 AND 2. THE PULVERIZED COAL FIRED BOILERS WILL HAVE A MW RATING OF 440 EACH. PULLMAN KELLOG HAS BEEN AWARDED A CONTRACT FOR A WET LIMESTONE FGD SYSTEM. START-UP IS SCHEDULED FOR 1986.
BIG RIVERS ELECTRIC GREEN 1 NEW 242 MW (GROSS) 242 MW (ESC) COAL 3.75 %S BITUMINOUS LIME AMERICAN AIR FILTER ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 12/79	UNIT 1 OF BIG RIVERS ELECTRIC'S GREEN STATION IS LOCATED IN SEBREE,KENTUCKY. THE DRY BOTTOM PULVERIZED COAL (3.75% S, 9750 BTU/LB) FIRED BOILER SUPPLIES 1,000,000 ACFM TO A COLD SIDE ESP FOLLOWED BY TWO AMERICAN AIR FILTER LIME SPRAY TOWERS WHICH WILL REMOVE 90% OF THE SO2. THE CLEANED GAS PASSES THROUGH A CHEVRON MIST ELIMINATOR AND EXITS A SAUERISEN 72 LINED STACK AFTER IT IS HEATED BY STEAM COIL REHEATER. THE SLUDGE FROM THE CLOSED WATER LOOP SYSTEM IS POZ-O-TEC STABILIZED. OPERATIONS COMMENCED IN DECEMBER 1979.
BIG RIVERS ELECTRIC GREEN 2 NEW 242 MW (GROSS) 242 MW (ESC) COAL 3.75 %S BITUMINOUS LIME AMERICAN AIR FILTER ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 11/80	UNIT 2 OF BIG RIVERS ELECTRIC'S GREEN STATION IS LOCATED IN SEBREE, KENTUCKY. THE DRY BOTTOM PULVERIZED COAL (3.75% S, 9750 BTU/LB) FIRED BOILER SUPPLIES 1,000,000 ACFM TO A COLD SIDE ESP FOLLOWED BY TWO AMERICAN AIR FILTER LIME SPRAY TOWERS WHICH REMOVE 90% OF THE SO2. THE CLEANED GAS PASSES THROUGH A CHEVRON MIST ELIMINATOR AND EXITS A SAUERISEN 72 LINED STACK AFTER IT IS HEATED BY A STEAM COIL REHEATER. THE SLUDGE FROM THE CLOSED WATER LOOP SYSTEM IS POZ-O-TEC STABILIZED. OPERATIONS COMMENCED IN NOVEMBER 1980.
CAJUN ELECTRIC POWER CHICOT 1 NEW 562 MW (GROSS) 562 MW (ESC) LIGNITE 1.70 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/86	CAJUN ELECTRIC POWER COOP HAS PLANS FOR A NEW UNIT, CHICOT 1, TO BE LOCATED IN SHREVEPORT, LOUISIANA. THE UTILITY IS CONSIDERING A DRY SCRUBBING FGD SYSTEM FOR EMISSION CONTROL FROM THE LIGNITE FIRED BOILER. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1986.

UNIT IDENTIFICATION	ABSTRACT
CAJUN ELECTRIC POWER CHICOT 2 NEW 562 MW (GROSS) 562 MW (ESC) LIGNITE 1.70 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/88	CAJUN ELECTRIC POWER COOP HAS PLANS FOR A NEW UNIT, CHICOT 2, TO BE LOCATED IN SHREVEPORT, LOUISIANA. THE UTILITY IS CONSIDERING A DRY SCRUBBING FGD SYSTEM FOR EMISSION CONTROL FROM THE LIGNITE FIRED BOILER. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1988.
CAJUN ELECTRIC POWER CHICOT 3 NEW 562 MW (GROSS) 562 MW (ESC) LIGNITE 1.70 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/92	CAJUN ELECTRIC POWER COOP HAS PLANS FOR A NEW UNIT, CHICOT 3, TO BE LOCATED IN SHREVEPORT, LOUISIANA. THE UTILITY IS CONSIDERING A DRY SCRUBBING FGD SYSTEM FOR EMISSION CONTROL FROM THE LIGNITE FIRED BOILER. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1992.
CAJUN ELECTRIC POWER CHICOT 4 NEW 562 MW (GROSS) 562 MW (ESC) LIGNITE 1.70 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/94	CAJUN ELECTRIC POWER COOP HAS PLANS FOR A NEW UNIT, CHICOT 4, TO BE LOCATED IN SHREVEPORT, LOUISIANA. THE UTILITY IS CONSIDERING A DRY SCRUBBING FGD SYSTEM FOR EMISSION CONTROL FROM THE LIGNITE FIRED BOILER. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1994.
CAJUN ELECTRIC POWER OXBOW 1 NEW 540 MW (GROSS) 540 MW (ESC) COAL .60 %S LIGNITE PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 5 STARTUP 0/85	CAJUN ELECTRIC HAS PLANS TO CONSTRUCT A 540 MW UNIT, OXBOW 1, TO BE LOCATED IN DE SOLO PARISH, LOUISIANA. THE UTILITY IS REQUESTING BIDS FOR A DRY SCRUBBING PROCESS TO CONTROL EMISSIONS FROM THE PULVERIZED COAL FIRED BOILER. THE UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN 1985.
CAJUN ELECTRIC POWER OXBOW 2 NEW 540 MW (GROSS) 540 MW (ESC) COAL .60 %S LIGNITE PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/85	CAJUN ELECTRIC HAS PLANS TO CONSTRUCT A 540 MW UNIT, OXBOW 2, TO BE LOCATED IN DE SOLO PARISH, LOUISIANA. THE UTILITY IS PRESENTLY CONSIDERING A DRY SCRUBBING PROCESS TO CONTROL EMISSIONS FROM THE PULVERIZED COAL FIRED BOILER. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1985.
CENTRAL ILLINOIS LIGHT DUCK CREEK 1 NEW 416 MW (GROSS) 416 MW (ESC) COAL 3.66 %S BITUMINOUS LIMESTONE ENVIRONEERING, RILEY STOKER ENERGY CONSUMPTION: 2.9% STATUS 1 STARTUP 7/76	DUCK CREEK 1 OF CENTRAL ILLINOIS LIGHT IS LOCATED IN CANTON, ILLINOIS. THE BALANCED DRAFT, FRONT FIRED, DRY BOTTOM UNIT BURNS PULVERIZED BITUMINOUS COAL (3.66% S, 10,500 BTU/LB) AND SUPPLIES 2,415,000 ACFM OF FLUE GAS TO TWO COLD SIDE ESP'S FOLLOWED BY FOUR RILEY STOKER/ENVIRONEERING ROD DECK SPRAY TOWER MODULES. THE FGD SYSTEM HAS BEEN OPERATIONAL (ONE MODULE) SINCE JULY, 1976, AND IS DESIGNED TO REMOVE 85% OF THE SO_2. HORIZONTAL CHEVRON MIST ELIMINATORS FOLLOW THE ABSORBERS, AND THE CLEANED GAS EXITS TO A 500 FOOT CEILCOTE LINED STACK WITHOUT REHEAT. THE SYSTEM OPERATES IN A CLOSED WATER LOOP, AND THE SLUDGE IS DISPOSED OF IN AN ON SITE CLAY LINED POND.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
CENTRAL ILLINOIS LIGHT DUCK CREEK 2 NEW 450 MW (GROSS) 450 MW (ESC) COAL 3.30 %S BITUMINOUS LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 1/87	CENTRAL ILLINOIS LIGHT IS CURRENTLY INVESTIGATING A LIMESTONE OR DUAL ALKALI FGD SYSTEM FOR UNIT 2 AT ITS DUCK CREEK STATION. THE BITUMINOUS COAL FIRED BOILER WILL FEED ITS FLUE GAS THROUGH A COLD SIDE ESP. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP AND IS SCHEDULED TO BEGIN OPERATIONS IN JANUARY 1987.
CENTRAL ILLINOIS PUBLIC SERV NEWTON 1 NEW 617 MW (GROSS) 617 MW (ESC) COAL 2.25 %S BITUMINOUS DUAL ALKALI GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: 2.4% STATUS 1 STARTUP 9/79	NEWTON 1 OF CENTRAL ILLINOIS PUBLIC SERVICE IS A TANGENTIALLY FIRED, DRY BOTTOM, PULVERIZED BITUMINOUS COAL (2.25% S, 10,900 BTU/LB) FIRED UNIT LOCATED IN NEWTON, ILLINOIS. A COLD SIDE ESP RECEIVES 2,163,480 ACFM OF FLUE GAS AND FEEDS IT TO FOUR GEESI POLYSPHERE PACKED TRAY TOWERS FOLLOWED BY TWO VERTICAL MIST ELIMINATORS PER MODULE. THE CLEANED GAS IS BOOSTED 25 DEG F BY A COMBINATION OF TWO DIFFERENT TYPES OF IN-LINE REHEATERS PLUS BYPASS REHEAT, AND THEN EXITS A 530 FOOT PRECRETE LINED STACK. THE WATER LOOP IS CLOSED, AND THE SLUDGE IS POZ-O-TEC TREATED.
CENTRAL MAINE POWER SEARS ISLAND 1 NEW 600 MW (GROSS) 600 MW (ESC) COAL 2.23 %S BITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 11/89	SEARS ISLAND 1 IS A PLANNED UNIT TO BE BUILT ON PENOBSCOT BAY BY CENTRAL MAINE POWER. BECAUSE OF THE DISCOVERY OF A GEOLOGICAL FAULT ON SEARS ISLAND, PLANS FOR A 1150 MW NUCLEAR POWER PLANT HAVE BEEN REPLACED WITH PLANS FOR A 600 MW COAL FIRED PLANT. LIME AND LIMESTONE SCRUBBING ARE THE PRIMARY METHODS BEING CONSIDERED FOR COMPLIANCE WITH THE NSPS. IT WILL BE TWO YEARS BEFORE ALL PERMITS REQUIRED HAVE BEEN RECEIVED. START-UP IS SCHEDULED FOR NOVEMBER 1989.
CENTRAL POWER & LIGHT COLETO CREEK 2 NEW 720 MW (GROSS) 720 MW (ESC) COAL .39 %S SUBBITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 9/92	COLETO CREEK 2 OF CENTRAL POWER AND LIGHT IS A COAL (.39%S) FIRED UNIT PLANNED FOR CONSTRUCTION IN FANNIN, TEXAS. THE UNIT IS BEING BUILT BY CENTRAL AND SOUTHWEST SERVICES, BUT WILL BE OPERATED BY CENTRAL POWER AND LIGHT. ONLY DRY SCRUBBING IS BEING CONSIDERED FOR SO2 CONTROL. START-UP IS TENTATIVELY SCHEDULED FOR SEPTEMBER 1992.
CINCINNATI GAS & ELECTRIC EAST BEND 1 NEW 650 MW (GROSS) 650 MW (ESC) COAL 4.00 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: 2.9% STATUS 6 STARTUP 0/88	CINCINNATI GAS AND ELECTRIC HAS PLANS FOR A NEW UNIT, EAST BEND 1, TO BE LOCATED ADJACENT TO EAST BENT 2 AT THE RABBITHASH, KENTUCKY SITE. THE COAL FIRED BOILER WILL HAVE A GENERATING CAPACITY OF 650 MW. THE UNIT IS SCHEDULED TO START-UP IN 1988.
CINCINNATI GAS & ELECTRIC EAST BEND 2 NEW 650 MW (GROSS) 650 MW (ESC) COAL 3.00 %S LIME BABCOCK & WILCOX ENERGY CONSUMPTION: 2.9% STATUS 1 STARTUP 3/81	EAST BEND 2 OF CINCINNATI GAS AND ELECTRIC IS A PULVERIZED COAL (5% S, DESIGN) FIRED BOILER LOCATED IN RABBITHASH, KENTUCKY. THE EMISSION CONTRO SYSTEM CONSISTS OF A HOT SIDE ESP FOLLOWED BY THREE BABCOCK AND WILCOX LIME FGD MODULES. THE 37% CLEANED GAS PASSES THROUGH A CHEVRON MIST ELIMINATOR BEFORE BEING WARMED BY AN INDIRECT HOT AIR REHEATER AND EXITS THROUGH A BRICK LINED 650 FOOT STACK. THE SLUDGE FROM THIS CLOSED WATER LOOP IS POZ-O-TEC STABILIZED BEFORE DISPOSAL IN AN ON SITE LANDFILL. OPERATIONS COMMENCED IN MARCH 1981.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
COLORADO UTE ELECTRIC CRAIG 1 NEW 455 MW (GROSS) 410 MW (ESC) COAL .45 %S SUBBITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: 1.3% STATUS 1 STARTUP 10/80	THE COLORADO UTE ELECTRIC ASSN HAS CONSTRUCTED A NEW UNIT, CRAIG 1, LOCATED IN CRAIG, COLORADO. BOTH UNITS FIRE PULVERIZED SUBBITUMINOUS COAL (0.45% S, 10,000 BTU/LB). THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A HOT SIDE ESP AND FOUR LIMESTONE SPRAY TOWERS FOR REMOVAL OF PARTICULATE MATTER AND 85% OF THE SO2. THE SCRUBBER EXHAUST IS HEATED BY A BYPASS REHEATER AND PASSES THROUGH A 600 FOOT ACID LINED STACK. THE SYSTEM OPERATES IN A CLOSED WATER LOOP AND THE STABILIZED SLUDGE IS DISPOSED OF IN AN OFF SITE MINEFILL. UNIT 1 START-UP IS EXPECTED IN OCTOBER 1980.
COLORADO UTE ELECTRIC CRAIG 2 NEW 455 MW (GROSS) 410 MW (ESC) COAL .45 %S SUBBITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: -2.0% STATUS 1 STARTUP 12/79	THE CRAIG 2 UNIT OF THE COLORADO UTE ELECTRIC ASSN IS LOCATED IN CRAIG, COLORADO AND FIRES PULVERIZED SUBBITUMINOUS COAL (0.45%S, 10,000 BTU/LB). THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A HOT SIDE ESP AND FOUR LIMESTONE SPRAY TOWERS FOR REMOVAL OF PARTICULATE MATTER AND 85% OF THE SO2. THE SCRUBBER EXHAUST IS HEATED BY A BYPASS REHEATER AND PASSES THROUGH A 600 FOOT ACID BRICK LINED STACK. THE SYSTEM OPERATES IN A CLOSED LOOP, AND THE STABILIZED SLUDGE IS DISPOSED OF IN AN OFF SITE MINEFILL. START-UP OF UNIT 2 WAS IN DECEMBER 1979.
COLORADO UTE ELECTRIC CRAIG 3 NEW 447 MW (GROSS) 447 MW (ESC) COAL .45 %S SUBBITUMINOUS LIME/SPRAY DRYING BABCOCK & WILCOX ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 4/83	CRAIG 3 OF COLORADO UTE ELECTRIC ASSN. IS UNDER CONSTRUCTION IN CRAIG, COLORADO. THE UNIT WILL FIRE PULVERIZED SUBBITUMINOUS COAL (0.45% S, 10,000 BTU/LB). THE DRY SCRUBBING SYSTEM UTILIZING LIME INJECTION WILL BE SUPPLIED BY BABCOCK AND WILCOX. THE UNIT WILL HAVE A FABRIC FILTER FOR PARTICULATE MATTER CONTROL. OPERATION OF THE FGD SYSTEM IS SCHEDULED TO COMMENCE IN 1983.
COLUMBUS & SOUTHERN OHIO ELEC CONESVILLE 5 NEW 411 MW (GROSS) 411 MW (ESC) COAL 4.67 %S BITUMINOUS LIME AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: 3.9% STATUS 1 STARTUP 1/77	CONESVILLE 5 OF COLUMBUS AND SOUTHERN OHIO ELECTRIC IS A DRY BOTTOM, PULVERIZED BITUMINOUS COAL (4.67% S, 10,850 BTU/LB) FIRED UNIT LOCATED IN CONESVILLE, OHIO. A COLD SIDE ESP RECEIVES 1,393,893 ACFM OF FLUE GAS AND PASSES IT TO TWO THIOSORBIC LIME TCA MODULES SUPPLIED BY UOP. THE SO2 REMOVAL EFFICIENCY OF THE TWO MODULES, WHICH BEGAN INITIAL OPERATION IN JANUARY 1977, IS 89.5% (DESIGN). EACH MODULE HAS ONE BULK ENTRAINMENT SEPARATOR AND TWO CHEVRON MIST ELIMINATORS. THE CLEANED GAS EXITS THROUGH AN 800 FOOT TALL ACID BRICK LINED STACK. THE POZ-O-TEC STABILIZED SLUDGE IS PUMPED INTO AN ON SITE DIKED LANDFILL. THE SYSTEM OPERATES IN AN OPEN WATER LOOP.
COLUMBUS & SOUTHERN OHIO ELEC CONESVILLE 6 NEW 411 MW (GROSS) 411 MW (ESC) COAL 4.67 %S BITUMINOUS LIME AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: 3.9% STATUS 1 STARTUP 6/78	CONESVILLE 6 OF COLUMBUS AND SOUTHERN OHIO ELECTRIC IS A DRY BOTTOM, PULVERIZED BITUMINOUS COAL (4.67% S, 10,850 BTU/LB) FIRED UNIT LOCATED IN CONESVILLE, OHIO. A COLD SIDE ESP RECEIVES 1,393,893 ACFM OF FLUE GAS AND PASSES IT TO TWO THIOSORBIC LIME TCA MODULES SUPPLIED BY UOP. THE SO2 REMOVAL EFFICIENCY OF THE TWO MODULES, WHICH BEGAN INITIAL OPERATION IN JUNE 1978, IS 89.5% (DESIGN). EACH MODULE HAS ONE BULK ENTRAINMENT SEPARATOR AND TWO CHEVRON MIST ELIMINATORS. THE CLEANED GAS EXITS THROUGH AN 800 FOOT TALL ACID BRICK LINED STACK. THE POZ-O-TEC STABILIZED SLUDGE IS PUMPED INTO AN ON SITE DIKED LANDFILL. THE SYSTEM OPERATES IN AN OPEN WATER LOOP.
COLUMBUS & SOUTHERN OHIO ELEC POSTON 5 NEW 425 MW (GROSS) 375 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: 4.7% STATUS 6 STARTUP 8/86	COLUMBUS AND SOUTHERN OHIO ELECTRIC HAS PLANS FOR TWO NEW UNITS, POSTON 5 AND 6, TO BE LOCATED IN ATHENS, OHIO. THE COAL (2.5% S, 11,000 BTU/LB) FIRED UNITS WILL UTILIZE EITHER A LIME, LIMESTONE, OR DUAL ALKALI FGD SYSTEM. START-UP OF UNIT 5 IS EXPECTED IN 1986.

UNIT IDENTIFICATION	ABSTRACT
COLUMBUS & SOUTHERN OHIO ELEC POSTON 6 NEW 425 MW (GROSS) 375 MW (ESC) COAL 2.50 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: 4.7% STATUS 6 STARTUP 0/89	COLUMBUS AND SOUTHERN OHIO ELECTRIC HAS PLANS FOR TWO NEW UNITS, POSTON 5 AND 6, TO BE LOCATED IN ATHENS, OHIO. THE COAL (2.5% S, 11,000 BTU/LB) FIRED UNITS WILL UTILIZE EITHER A LIME, LIMESTONE, OR DUAL ALKALI FGD SYSTEM. START-UP OF UNIT 6 IS EXPECTED IN 1989.
COMMONWEALTH EDISON POWERTON 51 RETROFIT 450 MW (GROSS) 450 MW (ESC) COAL 3.53 %S LIMESTONE AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: 5.6% STATUS 1 STARTUP 4/80	COMMONWEALTH EDISON HAS RETROFITTED BOILER NUMBER 51 AT ITS POWERTON STATION WITH A UOP LIMESTONE FGD SYSTEM. UNIT 51 IS ONE OF TWO IDENTICAL BOILERS SUPPLYING STEAM TO AN 850 MW TURBINE. THE PULVERIZED COAL (3.53% S, 10,500 BTU/LB) FIRED BOILER FEEDS FLUE GAS THROUGH AN ESP TO 3 TCA MODULES WHICH ARE DESIGNED TO REMOVE 74% OF THE SO2. A STEAM INDIRECT HOT AIR REHEATER BOOSTS THE TEMPERATURE BEFORE THE GAS EXITS AN ACID BRICK LINED STACK. THE SYSTEM OPERATES IN A CLOSED WATER LOOP, AND THE SLUDGE IS POZ-O-TEC STABILIZED AND DISPOSED OF IN A LANDFILL. THE FGD SYSTEM COMMENCED OPERATION IN APRIL, 1980.
COOPERATIVE POWER ASSOCIATION COAL CREEK 1 NEW 545 MW (GROSS) 327 MW (ESC) COAL .63 %S LIGNITE LIME/ALKALINE FLYASH COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 7/79	COAL CREEK 1 AND 2 ARE TWO PULVERIZED LIGNITE (0.63% S, 6258 BTU/LB) FIRED UNITS OWNED BY THE COOPERATIVE POWER ASSN AND UNITED POWER. A COLD SIDE ESP RECEIVES 2,200,000 ACFM OF FLUE GAS AND EXHAUSTS IT TO FOUR COUNTER-CURRENT SPRAY TOWERS. MIST ELIMINATION IS PROVIDED BY A BULK ENTRAINMENT SEPARATOR AND TWO CHEVRON MIST ELIMINATORS. A MINIMUM OF 40% BYPASS REHEAT IS PROVIDED BEFORE THE CLEANED GAS EXITS THE 650 FOOT ACID BRICK LINED STACK. THE TOWER DESIGN SO2 REMOVAL EFFICIENCY IS 90%. THE SYSTEM OPERATES IN AN OPEN WATER LOOP, AND THE FLYASH STABILIZED SLUDGE IS DISPOSED IN A CLAY LINED POND. UNIT 1 OPERATIONS BEGAN IN JULY 1979.
COOPERATIVE POWER ASSOCIATION COAL CREEK 2 NEW 545 MW (GROSS) 327 MW (ESC) COAL .63 %S LIGNITE LIME/ALKALINE FLYASH COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 7/80	COAL CREEK 1 AND 2 ARE TWO PULVERIZED LIGNITE (0.63% S, 6258 BTU/LB) FIRED UNITS OWNED BY THE COOPERATIVE POWER ASSN AND UNITED POWER. A COLD SIDE ESP RECEIVES 2,200,000 ACFM OF FLUE GAS AND EXHAUSTS IT TO FOUR COUNTER-CURRENT SPRAY TOWERS. MIST ELIMINATION IS PROVIDED BY A BULK ENTRAINMENT SEPARATOR AND TWO CHEVRON MIST ELIMINATORS. A MINIMUM OF 40% BYPASS REHEAT IS PROVIDED BEFORE THE CLEANED GAS EXITS THE 650 FOOT ACID BRICK LINED STACK. THE TOWER DESIGN SO2 REMOVAL EFFICIENCY IS 90%. THE SYSTEM OPERATES IN AN OPEN WATER LOOP, AND THE FLYASH STABILIZED SLUDGE IS DISPOSED OF IN A CLAY LINED POND. UNIT 2 COMMENCED OPERATIONS IN JULY 1980.
DELMARVA POWER & LIGHT DELAWARE CITY 1 RETROFIT 60 MW (GROSS) 60 MW (ESC) COKE 7.00 %S BITUMINOUS WELLMAN LORD DAVY MCKEE ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 5/80	DELAWARE CITY 1, 2, AND 3 OF DELMARVA POWER AND LIGHT ARE THREE RETRO-FITTED COKE (7-8% S) FIRED BOILERS WHICH HAVE A STEAM CAPACITY OF 500K LB/HR EACH. THE BOILERS GENERATE STEAM AS WELL AS ELECTRICITY FOR GETTY REFINING AND MARKETING. EACH BOILER SUPPLIES 295,000 ACFM OF FLUE GAS TO A MECHANICAL COLLECTOR THEN TO A VENTURI PARTICLE SCRUBBER FOR PARTICULATE CONTROL. THE FLUE GAS THEN PASSES THROUGH A CHEVRON TYPE MIST ELIMINATOR TO A WET ESP FOR BOTH PARTICULATE AND ACID MIST REMOVAL. A FOUR STAGE WELLMAN-LORD SYSTEM, WHICH IS DESIGN FOR 90% REMOVAL, IS USED FOR SO2 CONTROL. HOT AIR INJECTION REHEAT IS USED BEFORE THE GAS EXITS OUT A 500 FT. STACK. THE EMISSION CONTROL SYSTEM IS SUPPLIED BY DAVY MCKEE. IT IS A CLOSED LOOP WATER SYSTEM. THE SYSTEM BECAME OPERATIONAL IN MAY 1980.
DELMARVA POWER & LIGHT DELAWARE CITY 2 RETROFIT 60 MW (GROSS) 60 MW (ESC) COKE 7.00 %S BITUMINOUS WELLMAN LORD DAVY MCKEE ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 5/80	DELAWARE CITY 1, 2, AND 3 OF DELMARVA POWER AND LIGHT ARE THREE RETRO-FITTED COKE (7-8% S) FIRED BOILERS WHICH HAVE A STEAM CAPACITY OF 500K LB/HR EACH. THE BOILERS GENERATE STEAM AS WELL AS ELECTRICITY FOR GETTY REFINING AND MARKETING. EACH BOILER SUPPLIES 295,000 ACFM OF FLUE GAS TO A MECHANICAL COLLECTOR THEN TO A VENTURI PARTICLE SCRUBBER FOR PARTICULATE CONTROL. THE FLUE GAS THEN PASSES THROUGH A CHEVRON TYPE MIST ELIMINATOR TO A WET ESP FOR BOTH PARTICULATE AND ACID MIST REMOVAL. A FOUR STAGE WELLMAN-LORD SYSTEM, WHICH IS DESIGN FOR 90% REMOVAL, IS USED FOR SO2 CONTROL. HOT AIR INJECTION REHEAT IS USED BEFORE THE GAS EXITS OUT A 500 FT. STACK. THE EMISSION CONTROL SYSTEM IS SUPPLIED BY DAVY MCKEE. IT IS A CLOSED LOOP WATER SYSTEM. THE SYSTEM BECAME OPERATIONAL IN MAY 1980.

UNIT IDENTIFICATION	ABSTRACT
DELMARVA POWER & LIGHT DELAWARE CITY 3 RETROFIT 60 MW (GROSS) 60 MW (ESC) COKE 7.00 %S BITUMINOUS WELLMAN LORD DAVY MCKEE ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 5/80	DELAWARE CITY 1, 2, AND 3 OF DELMARVA POWER AND LIGHT ARE THREE RETROFITTED COKE (7-8% S) FIRED BOILERS WHICH HAVE A STEAM CAPACITY OF 500K LB/HR EACH. THE BOILERS GENERATE STEAM AS WELL AS ELECTRICITY FOR GETTY REFINING AND MARKETING. EACH BOILER SUPPLIES 295,000 ACFM OF FLUE GAS TO A MECHANICAL COLLECTOR THEN TO A VENTURI PARTICLE SCRUBBER FOR PARTICULATE CONTROL. THE FLUE GAS THEN PASSES THROUGH A CHEVRON TYPE MIST ELIMINATOR TO A WET ESP FOR BOTH PARTICULATE AND ACID MIST REMOVAL. A FOUR STAGE WELLMAN-LORD SYSTEM, WHICH IS DESIGN FOR 90% REMOVAL, IS USED FOR SO2 CONTROL. HOT AIR INJECTION REHEAT IS USED BEFORE THE GAS EXITS OUT A 500 FT. STACK. THE EMISSION CONTROL SYSTEM IS SUPPLIED BY DAVY MCKEE. IT IS A CLOSED LOOP WATER SYSTEM. THE SYSTEM BECAME OPERATIONAL IN MAY 1980.
DELMARVA POWER & LIGHT VIENNA 9 NEW 550 MW (GROSS) 550 MW (ESC) COAL 2.50 %S BITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: 2.7% STATUS 6 STARTUP 5/88	DELMARVA POWER AND LIGHT IS PLANNING A NEW 550 MW (GROSS) UNIT, VIENNA 9, BE CONSTRUCTED IN VIENNA, MARYLAND. THE UTILITY IS PRESENTLY CONSIDERING A LIMESTONE FGD UNIT FOR EMISSION CONTROL. THE PULVERIZED COAL FIRED UNIT WILL BURN COAL WITH AN AVERAGE SULFUR CONTENT OF 2.7% AND IS EXPECTED TO COMMENCE OPERATIONS IN JUNE 1987.
DESERET GEN & TRANS BONANZA 1 NEW 410 MW (GROSS) 410 MW (ESC) COAL .50 %S BITUMINOUS LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 9/84	BONANZA (FORMERLY MOON LAKE) 1 IS A PULVERIZED COAL (.5% S, 10,500 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN VERNAL, UTAH. THE FGD SYSTEM IS BEING SUPPLIED BY COMBUSTION ENGINEERING. THE WET LIMESTONE SCRUBBING SYSTEM WILL HAVE AN SO2 REMOVAL EFFICIENCY OF 95%. THE SYSTEM WILL FEATURE A BAGHOUSE SUPPLIED BY ECOLAIRE TO REMOVE 99.6% OF THE PARTICULATE MATTER. THE UNIT WILL OPERATE IN A CLOSED WATER LOOP WITH SLUDGE DISPOSAL ON SITE IN A LANDFILL. OPERATIONS ARE SCHEDULED TO COMMENCE IN SEPTEMBER 1984.
DESERET GEN & TRANS BONANZA 2 NEW 410 MW (GROSS) 410 MW (ESC) COAL .50 %S BITUMINOUS LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 5 STARTUP 0/88	BONANZA (FORMERLY MOON LAKE) 2 IS A PULVERIZED COAL (.5% S, 10,500 BTU/LB) FIRED UNIT PLANNED BY DESERET GENERATION & TRANS. COOP TO BE LOCATED IN VERNAL, UTAH. THE UTILITY IS PRESENTLY REQUESTING BIDS FOR A WET LIMESTONE SCRUBBING SYSTEM HAVING AN SO2 REMOVAL EFFICIENCY OF 95%. THE SYSTEM WILL FEATURE A BAGHOUSE DESIGNED TO REMOVE 99.6% OF THE PARTICULATE. THE UNIT WILL OPERATE IN A CLOSED WATER LOOP WITH SLUDGE DISPOSAL ON SITE IN A LANDFILL. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1988.
DUQUESNE LIGHT ELRAMA 1-4 RETROFIT 510 MW (GROSS) 510 MW (ESC) COAL 2.20 %S LIME GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: 3.5% STATUS 1 STARTUP 10/75	ELRAMA 1-4 OF DUQUESNE LIGHT CONSISTS OF FOUR PULVERIZED COAL (2.2% S, 11,350 BTU/LB) FIRED UNITS LOCATED IN ELRAMA, PENNSYLVANIA. THE EMISSION CONTROL SYSTEM ON THIS SITE CONSISTS OF AN ESP FOLLOWED BY A MECHANICAL COLLECTOR AND FIVE VARIABLE THROAT VENTURI LIME ABSORBER MODULES SUPPLIED BY GEESI, WHICH ARE DESIGNED TO REMOVE 83% OF THE SO2 FROM THE FLUE GAS. THE CLEANED GAS PASSES THROUGH A DIRECT OIL FIRED REHEATER BEFORE EXITING A 400 FOOT ACID BRICK LINED STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP, AND THE POZ-O-TEC STABILIZED SLUDGE IS HAULED TO AN OFF SITE LANDFILL. THE SYSTEM HAS BEEN OPERATIONAL SINCE OCTOBER 1975.
DUQUESNE LIGHT PHILLIPS 1-6 RETROFIT 408 MW (GROSS) 408 MW (ESC) COAL 1.92 %S BITUMINOUS LIME GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: 3.4% STATUS 1 STARTUP 7/73	THE PHILLIPS POWER STATION OF DUQUESNE LIGHT CONSISTS OF SIX DRY BOTTOM PULVERIZED COAL (1.92% S, 11,350 BTU/LB) FIRED UNITS LOCATED IN SOUTH HEIGHT, PENNSYLVANIA. PARTICULATE CONTROL IS ACCOMPLISHED BY SIX ESP/MECHANICAL COLLECTOR COMBINATIONS (ONE/BOILER). ONE TWO STAGE AND THREE SINGLE STAGE VARIABLE THROAT VENTURI LIME FGD MODULES SUPPLIED BY GEESI ARE DESIGNED TO REMOVE 83% OF THE SO2 FROM THE FLUE GAS. TWO CHEVRON MIST ELIMINATORS/MODULE ARE FOLLOWED BY A DIRECT OIL FIRED REHEATER WHICH RAISES THE GAS TEMPERATURE BY 20 DEG F BEFORE IT LEAVES VIA A 340 FOOT TALL ACID BRICK LINED STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP, AND THE POZ-O-TEC STABILIZED SLUDGE IS TRUCKED TO AN OFF SITE LANDFILL. THE SYSTEM HAS BEEN OPERATIONAL SINCE JULY 1973.

UNIT IDENTIFICATION	ABSTRACT
EAST KENTUCKY POWER J.K. SMITH 1 NEW 650 MW (GROSS) 650 MW (ESC) COAL 1.50 %S BITUMINOUS LIME BABCOCK & WILCOX ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 8/87	THE EAST KENTUCKY POWER COOP HAS PLANS TO FIRE TWO NEW UNITS, J.K. SMITH 1 AND 2. A LETTER OF INTENT WAS SIGNED WITH BABCOCK AND WILCOX FOR A WET LIME PROCESS TO CONTROL EMISSIONS. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP MODE. START-UP FOR UNIT 1 IS EXPECTED IN 1987.
EAST KENTUCKY POWER SPURLOCK 2 NEW 500 MW (GROSS) 500 MW (ESC) COAL 3.50 %S LIME THYSSEN/CEA ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 4/83	SPURLOCK 2 OF EAST KENTUCKY POWER COOPERATIVE IS A BALANCED DRAFT PULVERIZED COAL (3.5% S, 11,000 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN MAYSVILLE, KENTUCKY. THE EMISSION CONTROL SYSTEM WILL CONSIST OF AN ESP FOLLOWED BY A THYSSEN/CEA LIME FGD SYSTEM (90% DESIGN SO2 REMOVAL EFF). FLUE GAS FROM UNIT ONE WILL BE USED TO REHEAT THE CLEANED GAS. THE SYSTEM, SLATED FOR START-UP IN 1983, WILL EMPLOY A CLOSED WATER LOOP AND POZ-O-TEC SLUDGE STABILIZATION.
FLORIDA POWER & LIGHT MARTIN 3 NEW 800 MW (GROSS) 800 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/87	FLORIDA POWER AND LIGHT HAS PLANS FOR TWO NEW UNITS, MARTIN 3 AND 4 TO BE LOCATED IN MARTIN COUNTY, FLORIDA. THE PULVERIZED COAL FIRED BOILERS WILL HAVE A MW RATING OF 800 EACH. THE UTILITY IS PRESENTLY CONSIDERING ONLY FGD AS THE EMISSION CONTROL STRATEGY. THE START-UP FOR UNIT 3 IS PROJECTED FOR 1987.
FLORIDA POWER & LIGHT MARTIN 4 NEW 800 MW (GROSS) 800 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/89	FLORIDA POWER AND LIGHT HAS PLANS FOR TWO NEW UNITS, MARTIN 3 AND 4 TO BE LOCATED IN MARTIN COUNTY, FLORIDA. THE PULVERIZED COAL FIRED BOILERS WILL HAVE A MW RATING OF 800 EACH. THE UTILITY IS PRESENTLY CONSIDERING ONLY FGD AS THE EMISSION CONTROL STRATEGY. THE START-UP FOR UNIT 4 IS PROJECTED FOR 1989.
GENERAL PUBLIC UTILITIES COAL 1 NEW 625 MW (GROSS) 625 MW (ESC) COAL 3.50 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 5 STARTUP 5/91	GENERAL PUBLIC UTILITIES HAS PLANS TO CONSTRUCT A 625 MW UNIT, COAL 1. THE UTILITY IS PRESENTLY REQUESTING/EVALUATING BIDS FOR A FGD SYSTEM TO CONTROL EMISSIONS. THE COAL FIRED (3.5% S) UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN MAY 1991.
GENERAL PUBLIC UTILITIES COAL 2 NEW 625 MW (GROSS) 625 MW (ESC) COAL 3.50 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 5/93	GENERAL PUBLIC UTILITIES IS PLANNING TO CONSTRUCT A 625 MW UNIT, COAL 2. THE UTILITY IS PRESENTLY CONSIDERING ONLY FGD AS THE EMISSION CONTROL STRATEGY. THE COAL FIRED (3.5% S) UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN 1993.

UNIT IDENTIFICATION	ABSTRACT
GENERAL PUBLIC UTILITIES COAL 3 NEW 625 MW (GROSS) 625 MW (ESC) COAL 3.50 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 5/95	GENERAL PUBLIC UTILITIES IS PLANNING TO CONSTRUCT A 625 MW UNIT, COAL 3. THE UTILITY IS PRESENTLY CONSIDERING ONLY FGD AS THE EMISSION CONTROL STRATEGY. THE COAL FIRED (3.5% S) UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN 1995.
GENERAL PUBLIC UTILITIES COAL 4 NEW 625 MW (GROSS) 625 MW (ESC) COAL 3.50 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 5/96	GENERAL PUBLIC UTILITIES HAS PLANS TO CONSTRUCT A 625 MW UNIT, COAL 4. THE UTILITY IS PRESENTLY CONSIDERING ONLY FGD AS THE EMISSION CONTROL STRATEGY. THE COAL FIRED (3.5% S) UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN 1996.
GENERAL PUBLIC UTILITIES SEWARD 7 NEW 690 MW (GROSS) 690 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: 9.4% STATUS 5 STARTUP 5/89	GENERAL PUBLIC UTILITIES IS PLANNING A NEW UNIT, SEWARD 7, TO BE BUILT IN SEWARD, PENNSYLVANIA. THE UTILITY IS PRESENTLY REQUESTING BIDS FOR AN FGD SYSTEM, WITH NON-SLURRY TYPE LIME AND LIMESTONE SYSTEMS BEING THE PRIMARY CONSIDERATION. START-UP IS EXPECTED IN MAY 1989.
GRAND HAVEN BRD OF LIGHT & PWR J.B. SIMS 3 NEW 65 MW (GROSS) 65 MW (ESC) COAL 2.75 %S BITUMINOUS LIME BABCOCK & WILCOX ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 1/83	THE GRAND HAVEN BOARD OF LIGHT AND POWER'S J.B. SIMS 3 IS A BITUMINIOUS COAL (2.75% S, 11,000 BTU/LB) FIRED BOILER UNDER CONSTRUCTION IN GRAND HAVEN, MICHIGAN. A CONTRACT HAS BEEN AWARDED TO BABCOCK AND WILCOX TO SUPPLY TWO SPRAY TOWERS TO CONTROL SO2 EMISSIONS. EACH SCRUBBER SYSTEM WILL UTILIZE A CHEVRON MIST ELIMINATOR AND AN IN-LINE REHEATER. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP MODE AND THE SLUDGE WILL BE DISPOSED OF IN AN OFF SITE LANDFILL. START-UP IS SCHEDULED FOR JAN. 1983.
HOOSIER ENERGY MEROM 1 NEW 490 MW (GROSS) 441 MW (ESC) COAL 3.50 %S LIMESTONE MITSUBISHI HEAVY INDUSTRIES ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 5/82	MEROM 1 AND 2 ARE TWO NEW UNITS BEING BUILT BY HOOSIER ENERGY IN SULLIVAN, INDIANA. THESE PULVERIZED COAL (3.5% S) FIRED UNITS WILL PRODUCE 1,732,000 ACFM OF FLUE GAS WHICH WILL BE CLEANED BY A COLD SIDE ESP UPSTREAM OF A MITSUBISHI LIMESTONE GRID TOWER ABSORBER (90% DESIGN SO2 REMOVAL). THE SYSTEM WILL UTILIZE BYPASS REHEAT AND A 700 FOOT STACK. THE SLUDGE WILL BE STABILIZED AND LANDFILLED, AND THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP MODE. START-UP OF UNIT 1 IS SCHEDULED FOR MAY 1982.
HOOSIER ENERGY MEROM 2 NEW 490 MW (GROSS) 441 MW (ESC) COAL 3.50 %S LIMESTONE MITSUBISHI HEAVY INDUSTRIES ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 11/81	MEROM 1 AND 2 ARE TWO NEW UNITS BEING BUILT BY HOOSIER ENERGY IN SULLIVAN, INDIANA. THESE PULVERIZED COAL (3.5% S) FIRED UNITS WILL PRODUCE 1,732,000 ACFM OF FLUE GAS WHICH WILL BE CLEANED BY A COLD SIDE ESP UPSTREAM OF A MITSUBISHI LIMESTONE GRID TOWER ABSORBER (90% DESIGN SO2 REMOVAL). THE SYSTEM WILL UTILIZE BYPASS REHEAT AND A 700 FOOT STACK. THE SLUDGE WILL BE STABILIZED AND LANDFILLED, AND THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP MODE. START-UP OF UNIT 2 IS SCHEDULED FOR NOVEMBER 1981.

UNIT IDENTIFICATION	ABSTRACT
HOUSTON LIGHTING & POWER LIMESTONE 1 NEW 750 MW (GROSS) 750 MW (ESC) COAL 1.08 %S LIGNITE LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 12/86	HOUSTON LIGHTING AND POWER CO HAS PLANS FOR TWO NEW UNITS, LIMESTONE 1 AND 2, TO BE LOCATED IN JEWITT, TEXAS. THE PULVERIZED COAL (1.08% S, 6177 BTU/LB) FIRED BOILER WILL UTILIZE A WET LIMESTONE SCRUBBING PROCESS FOR PRIMARY SO2 COLLECTION. A COLD SIDE ESP WILL ALSO BE USED FOR PRIMARY PARTICLE CONTROL. THE UTILITY HAS AWARDED A CONTRACT TO COMBUSTION ENGINEERING FOR THE INSTALLATION OF THIS SYSTEM. UNIT 1 IS SCHEDULED TO COMMENCE OPERATIONS IN 1986.
HOUSTON LIGHTING & POWER LIMESTONE 2 NEW 750 MW (GROSS) 750 MW (ESC) COAL 1.08 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 12/87	HOUSTON LIGHTING AND POWER CO HAS PLANS FOR TWO NEW UNITS, LIMESTONE 1 AND 2, TO BE LOCATED IN JEWITT, TEXAS. THE PULVERIZED COAL (1.08% S, 6177 BTU/LB) FIRED BOILER WILL UTILIZE A WET LIMESTONE SCRUBBING PROCESS FOR PRIMARY SO2 COLLECTION. A COLD SIDE ESP WILL ALSO BE USED FOR PRIMARY PARTICLE CONTROL. THE UTILITY HAS AWARDED A CONTRACT TO COMBUSTION ENGINEERING FOR THE INSTALLATION OF THIS SYSTEM. UNIT 2 IS SCHEDULED TO COMMENCE OPERATIONS IN 1987.
HOUSTON LIGHTING & POWER W.A. PARISH 8 NEW 600 MW (GROSS) 492 MW (ESC) COAL .60 %S SUBBITUMINOUS LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 11/82	W.A. PARISH 8 OF HOUSTON LIGHTING & POWER IS A PULVERIZED COAL (0.6% S, 8700 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN THOMPSONS, TEXAS. GEESI WILL SUPPLY A LIMESTONE FGD SYSTEM WHICH WILL REMOVE 82% OF THE FLUE GAS SO2. REHEAT WILL BE PROVIDED BY BYPASSING 18% OF THE PARTICULATE CLEANED FLUE GAS. SLUDGE WILL BE DEWATERED, BLENDED WITH FLYASH, AND DISPOSED IN AN ON SITE LANDFILL. OPERATIONS ARE SCHEDULED TO COMMENCE IN NOVEMBER 1982.
INDIANAPOLIS POWER & LIGHT PATRIOT 1 NEW 650 MW (GROSS) 650 MW (ESC) COAL 3.50 %S LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/87	INDIANAPOLIS POWER AND LIGHT HAS PLANS FOR THREE NEW UNITS, PATRIOT 1, 2, AND 3, TO BE LOCATED IN PATRIOT, INDIANA. THE UTILITY PLANS ON UTILIZING A LIMESTONE FGD PROCESS FOR EMISSION CONTROL.
INDIANAPOLIS POWER & LIGHT PATRIOT 2 NEW 650 MW (GROSS) 650 MW (ESC) COAL 3.50 %S LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/ 0	INDIANAPOLIS POWER AND LIGHT HAS PLANS FOR THREE NEW UNITS, PATRIOT 1, 2, AND 3, TO BE LOCATED IN PATRIOT, INDIANA. THE UTILITY PLANS ON UTILIZING A LIMESTONE FGD PROCESS FOR EMISSION CONTROL.
INDIANAPOLIS POWER & LIGHT PATRIOT 3 NEW 650 MW (GROSS) 650 MW (ESC) COAL 3.50 %S LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/ 0	INDIANAPOLIS POWER AND LIGHT HAS PLANS FOR THREE NEW UNITS, PATRIOT 1, 2, AND 3, TO BE LOCATED IN PATRIOT, INDIANA. THE UTILITY PLANS ON UTILIZING A LIMESTONE FGD PROCESS FOR EMISSION CONTROL.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
INDIANAPOLIS POWER & LIGHT PETERSBURG 3 NEW 532 MW (GROSS) 532 MW (ESC) COAL 3.25 %S BITUMINOUS LIMESTONE AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: 2.4% STATUS 1 STARTUP 12/77	PETERSBURG 3 OF INDIANAPOLIS POWER AND LIGHT IS LOCATED IN PETERSBURG, INDIANA, AND BURNS 3.25% S BITUMINOUS COAL (11,000 BTU/LB). TWO COLD SIDE ESP'S ARE LOCATED UPSTREAM OF 4 85% EFFICIENT UOP LIMESTONE TCA MODULES. A HORIZONTAL MIST ELIMINATOR PRECEDES AN INDIRECT HOT AIR REHEATER THAT BOOSTS THE GAS TEMPERATURE BY 30 DEG F BEFORE IT EXITS THE 616 FOOT RIGIFLAKE 4850 LINED STACK. STABILIZED SLUDGE IS DISPOSED IN AN ON SITE POND, AND THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE. THIS UNIT HAS BEEN OPERATIONAL SINCE DECEMBER 1977.
INDIANAPOLIS POWER & LIGHT PETERSBURG 4 NEW 530 MW (GROSS) 530 MW (ESC) COAL 3.50 %S BITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 2.1% STATUS 2 STARTUP 10/84	PETERSBURG 4 OF INDIANAPOLIS POWER AND LIGHT IS A BITUMINOUS COAL (3.50% S 11,000 BTU/LB) FIRED BOILER UNDER CONSTRUCTION IN PETERSBURG, INDIANA. THE LIMESTONE FGD SYSTEM FOR THIS UNIT WILL BE SUPPLIED BY RESEARCH COTTRELL. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP, AND SLUDGE WILL BE POZ-O-TEC STABILIZED BEFORE PONDING. START-UP IS SLATED FOR OCTOBER 1984.
IOWA ELECTRIC LIGHT & PWR GUTHRIE CO. 1 NEW 720 MW (GROSS) 720 MW (ESC) COAL .40 %S SUBBITUMINOUS LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 11/87	IOWA ELECTRIC LIGHT AND POWER HAS PLANS TO CONSTRUCT A 720 MW UNIT, GUTHRIE COUNTY 1, TO BE LOCATED IN PANORA, IOWA. A LETTER OF INTENT WAS SIGNED WITH COMBUSTION ENGINEERING TO PROVIDE A WET LIMESTONE FGD SYSTEM TO CONTROL SO2 EMISSIONS FROM THE PULVERIZED COAL (0.4% S, 8180 BTU/LB) FIRED BOILER. AN ESP IS TO BE USED FOR PARTICULATE MATTER REMOVAL. THE CLEANED FLUE GAS WILL EXIT A 650 FOOT STACK. OPERATIONS ARE SCHEDULED TO COMMENCE IN NOVEMBER 1987.
JACKSONVILLE ELEC AUTHORITY ST.JOHNS RIVER PWR PARK 1 NEW 600 MW (GROSS) 600 MW (ESC) COAL 2.50 %S LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 5 STARTUP 12/85	THE JACKSONVILLE ELECTRIC AUTHORITY HAS PLANS FOR TWO NEW UNITS, ST. JOHNS RIVER POWER PARK 1 AND 2, TO BE LOCATED IN EAST PORT, FLORIDA. EACH UNIT WILL BURN PULVERIZED COAL (2-4% S) AND SUPPLY 2,660,000 ACFM TO A WET LIMESTONE FGD PROCESS AND AN ESP FOR EMISSION CONTROL. THE UTILITY IS CURRENTLY EVALUATING BIDS FOR THE CONTROL SYSTEMS. THE CLEANED FLUE GAS IS TO EXIT A 285 FOOT STACK. UNIT 1 IS SCHEDULED TO COMMENCE OPERATIONS IN 1985.
JACKSONVILLE ELEC AUTHORITY ST.JOHNS RIVER PWR PARK 2 NEW 600 MW (GROSS) 600 MW (ESC) COAL 2.50 %S LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 5 STARTUP 6/87	THE JACKSONVILLE ELECTRIC AUTHORITY HAS PLANS FOR TWO NEW UNITS, ST. JOHNS RIVER POWER PARK 1 AND 2, TO BE LOCATED IN EAST PORT, FLORIDA. EACH UNIT WILL BURN PULVERIZED COAL (2-4% S) AND SUPPLY 2,660,000 ACFM TO A WET LIMESTONE FGD PROCESS AND AN ESP FOR EMISSION CONTROL. THE UTILITY IS CURRENTLY EVALUATING BIDS FOR THE CONTROL SYSTEMS. THE CLEANED FLUE GAS IS TO EXIT A 285 FOOT STACK. UNIT 2 IS SCHEDULED TO COMMENCE OPERATIONS IN 1987.
KANSAS CITY POWER & LIGHT HAWTHORN 3 RETROFIT 90 MW (GROSS) 90 MW (ESC) COAL .60 %S BITUMINOUS LIME COMBUSTION ENGINEERING ENERGY CONSUMPTION: 2.2% STATUS 1 STARTUP 11/72	HAWTHORN 3 OF KANSAS CITY POWER AND LIGHT IS A DRY BOTTOM PULVERIZED BITUMINOUS COAL (0.6% S, 9800 BTU/LB) FIRED UNIT LOCATED IN KANSAS CITY, MISSOURI, WHICH WAS CONVERTED FROM LIMESTONE FURNACE INJECTION AND TAIL END SCRUBBING TO A LIME SLURRY SYSTEM. TWO COMBUSTION ENGINEERING MARBLE BED ABSORBERS, WHICH WERE DESIGNED TO REMOVE 70% OF THE FLUE GAS SO2, BEGAN OPERATION IN JANUARY 1977. ONE HORIZONTAL CHEVRON MIST ELIMINATOR PER MODULE IS UPSTREAM OF AN IN-LINE FINNED TUBE REHEATER, WHICH RAISES THE TEMPERATURE OF THE CLEANED GAS BEFORE IT EXITS THROUGH A GUNITE LINED 200 FOOT STACK. THE FLYASH STABILIZED SLUDGE IS DEPOSITED IN AN UNLINED SLUDGE POND. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
KANSAS CITY POWER & LIGHT HAWTHORN 4 RETROFIT 90 MW (GROSS) 90 MW (ESC) COAL .60 %S BITUMINOUS LIME COMBUSTION ENGINEERING ENERGY CONSUMPTION: 2.2% STATUS 1 STARTUP 8/72	HAWTHORN 4 OF KANSAS CITY POWER AND LIGHT IS A DRY BOTTOM PULVERIZED BITUMINOUS COAL (0.6% S, 9800 BTU/LB) FIRED UNIT LOCATED IN KANSAS CITY, MISSOURI, WHICH WAS CONVERTED FROM LIMESTONE FURNACE INJECTION AND TAIL END SCRUBBING TO A LIME SLURRY SYSTEM. TWO COMBUSTION ENGINEERING MARBLE BED ABSORBERS, WHICH WERE DESIGNED TO REMOVE 70% OF THE FLUE GAS SO2, BEGAN OPERATION IN JANUARY 1977. ONE HORIZONTAL CHEVRON MIST ELIMINATOR PER MODULE IS UPSTREAM OF AN IN-LINE FINNED TUBE REHEATER, WHICH RAISES THE TEMPERATURE OF THE CLEANED GAS BEFORE IT EXITS THROUGH A GUNITE LINED 200 FOOT STACK. THE FLYASH STABILIZED SLUDGE IS DEPOSITED IN AN UNLINED SLUDGE POND. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE.
KANSAS CITY POWER & LIGHT LA CYGNE 1 NEW 820 MW (GROSS) 820 MW (ESC) COAL 5.39 %S SUBBITUMINOUS LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: 2.9% STATUS 1 STARTUP 2/73	LA CYGNE 1 IS A WET BOTTOM, CYCLONE FIRED PULVERIZED SUBBITUMINOUS COAL (5.39% S, 9421 BTU/LB) FIRED UNIT OF KANSAS CITY POWER AND LIGHT, LOCATED IN LA CYGNE, KANSAS. THE EMISSION CONTROL SYSTEM CONSISTS OF EIGHT VARIABLE THROAT VENTURI/LIMESTONE SIEVE TRAY TOWER TRAINS SUPPLIED BY BABCOCK AND WILCOX. EACH 80% (SO2 REMOVAL, DESIGN) EFFICIENT TRAIN IS FOLLOWED BY A COMBINATION SIEVE TRAY AND CHEVRON MIST ELIMINATOR, FOLLOWED BY AN INDIRECT REHEATER. THE CLEANED GAS EXITS THROUGH A 700 FOOT STEEL LINED STACK. THE SYSTEM OPERATES IN A CLOSED WATER LOOP, AND THE SCRUBBER SLUDGE IS DISPOSED IN AN UNLINED POND. INITIAL OPERATIONS OF THE FGD SYSTEM BEGAN IN FEBRUARY 1973.
KANSAS POWER & LIGHT JEFFREY 1 NEW 720 MW (GROSS) 540 MW (ESC) COAL .32 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 8/78	KANSAS CITY POWER AND LIGHT'S JEFFREY 1 IS A TANGENTIAL FIRED PULVERIZED COAL (0.32% S, 8125 BTU/LB) UNIT IN WAMEGO, KANSAS. THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A COLD SIDE ESP FOLLOWED BY SIX (ONE SPARE) LIMESTONE SPRAY TOWER MODULES SUPPLIED BY COMBUSTION ENGINEERING. THE DESIGN SO2 REMOVAL EFFICIENCY IS 50% (INCLUDING A 30% BYPASS REHEAT). THE UNIT HAS BEEN OPERATIONAL SINCE AUGUST 1978.
KANSAS POWER & LIGHT JEFFREY 2 NEW 700 MW (GROSS) 490 MW (ESC) COAL .30 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 1/80	UNIT 2, PRESENTLY OPERATING AT KANSAS POWER AND LIGHT'S JEFFREY ENERGY CENTER IN JEFFREY, KANSAS, BURNS 0.3% S PULVERIZED COAL (8100 BTU/LB). THIS UNIT'S EMISSION CONTROL SYSTEM CONSISTS OF A COLD SIDE ESP AND COMBUSTION ENGINEERING LIMESTONE SPRAY TOWERS. A 30% FLUE GAS BYPASS PROVIDES REHEAT OF THE CLEANED GAS BEFORE IT EXITS THROUGH A 600 FOOT STACK. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE, AND THE SLUDGE IS STABILIZED WITH BOTTOM ASH AND PIPED TO AN ON-SITE CLAY LINED POND. INITIAL OPERATIONS COMMENCED IN APRIL 1980.
KANSAS POWER & LIGHT LAWRENCE 4 RETROFIT 125 MW (GROSS) 125 MW (ESC) COAL .55 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 1/77	LAWRENCE 4 OF KANSAS POWER AND LIGHT IS A BALANCED DRAFT, TANGENTIAL FIRED PULVERIZED COAL (0.55% S, 10,000 BTU/LB) UNIT LOCATED IN LAWRENCE, KANSAS. A NEW COMBUSTION ENGINEERING LIMESTONE ROD DECK/SPRAY TOWER SYSTEM REPLACED THE EXISTING MARBLE BED TAIL END SCRUBBER IN JANUARY 1977. THE SYSTEM TREATS 403,000 ACFM OF FLUE GAS, WITH A DESIGN SO2 REMOVAL OF 73%. MIST ELIMINATION IS ACCOMPLISHED BY TWO CHEVRONS AND ONE BULK ENTRAINMENT SEPARATOR FOLLOWING EACH OF THE TWO MODULES. A FINNED TUBE REHEATER BOOSTS THE TEMPERATURE OF THE CLEANED GAS BY 20 DEG F BEFORE IT IS EXHAUSTED THROUGH A 120 FOOT STACK. THE SLUDGE IS DISPOSED IN AN UNLINED INTERIM POND, WHICH OVERFLOWS INTO A FINAL DISPOSAL POND. THE SYSTEM OPERATES IN A CLOSED WATER LOOP.
KANSAS POWER & LIGHT LAWRENCE 5 RETROFIT 420 MW (GROSS) 420 MW (ESC) COAL .55 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 4/78	LAWRENCE 5 OF KANSAS POWER AND LIGHT IS A BALANCED DRAFT, TANGENTIAL FIRED PULVERIZED COAL (0.55% S, 10,000 BTU/LB) UNIT LOCATED IN LAWRENCE, KANSAS. A NEW COMBUSTION ENGINEERING LIMESTONE ROD DECK/SPRAY TOWER SYSTEM REPLACED THE EXISTING MARBLE BED TAIL END SCRUBBER IN APRIL 1978. THE SYSTEM TREATS 403,000 ACFM OF FLUE GAS, WITH A DESIGN SO2 REMOVAL OF 73%. MIST ELIMINATION IS ACCOMPLISHED BY TWO CHEVRONS AND ONE BULK ENTRAINMENT SEPARATOR FOLLOWING EACH OF THE TWO MODULES. A FINNED TUBE REHEATER BOOSTS THE TEMPERATURE OF THE CLEANED GAS BY 20 DEG F BEFORE IT IS EXHAUSTED THROUGH A 120 FOOT STACK. THE SLUDGE IS DISPOSED IN AN UNLINED INTERIM POND, WHICH OVERFLOWS INTO A FINAL DISPOSAL POND. THE SYSTEM OPERATES IN A CLOSED WATER LOOP.

UNIT IDENTIFICATION	ABSTRACT
KENTUCKY UTILITIES GREEN RIVER 1-3 RETROFIT 64 MW (GROSS) 64 MW (ESC) COAL 4.00 %S BITUMINOUS LIME AMERICAN AIR FILTER ENERGY CONSUMPTION: 3.1% STATUS 1 STARTUP 9/75	GREEN RIVER 1-3 OF KENTUCKY UTILITIES ARE THREE DRY BOTTOM PULVERIZED BITUMINOUS COAL (4% S, 11,000 BTU/LB) FIRED UNITS LOCATED IN CENTRAL CITY, KENTUCKY. EACH BOILER SUPPLIES 360,000 ACFM OF FLUE GAS TO A VARIABLE THROAT VENTURI FOLLOWED BY AN AMERICAN AIR FILTER LIME MOBILE BED CONTACTOR (80% DESIGN SO2 REMOVAL EFFICIENCY). A RADIAL VANE MIST ELIMINATOR IS FOLLOWED BY A STEAM TUBE REHEATER AND A 165 FOOT STACK. SLUDGE IS DISPOSED IN AN ON-SITE UNLINED POND, AND THE SYSTEM OPERATES IN A CLOSED WATER LOOP. THE SYSTEM HAS BEEN OPERATIONAL SINCE SEPTEMBER 1975.
KENTUCKY UTILITIES HANCOCK 1 NEW 708 MW (GROSS) 650 MW (ESC) COAL 3.50 %S BITUMINOUS LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 4/89	KENTUCKY UTILITIES HAS PLANS TO CONSTRUCT TWO NEW 650 MW (NET) PULVERIZED COAL (3.5% S, 10,500 BTU/LB) FIRED BOILERS. THE UNITS, HANCOCK 1 AND 2, ARE TO BE LOCATED IN HAWESVILLE, KENTUCKY. THE UTILITY HAS SIGNED A LETTER OF INTENT WITH B & W FOR A WET LIMESTONE SCRUBBING SYSTEM WHICH WILL OPERATE IN A CLOSED WATER LOOP MODE TO CONTROL EMISSIONS. HANCOCK 1 AND 2 ARE SCHEDULED TO COMMENCE OPERATION IN 1989 AND 1994, RESPECTIVELY.
KENTUCKY UTILITIES HANCOCK 2 NEW 708 MW (GROSS) 650 MW (ESC) COAL 3.50 %S BITUMINOUS LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 4/94	KENTUCKY UTILITIES HAS PLANS TO CONSTRUCT TWO NEW 650 MW (NET) PULVERIZED COAL (3.5% S, 10,500 BTU/LB) FIRED BOILERS. THE UNITS, HANCOCK 1 AND 2, ARE TO BE LOCATED IN HAWESVILLE, KENTUCKY. THE UTILITY IS PRESENTLY INVESTIGATING A WET LIMESTONE SCRUBBING SYSTEM WHICH WILL OPERATE IN A CLOSED WATER LOOP MODE TO CONTROL EMISSIONS. HANCOCK 1 AND 2 ARE SCHEDULED TO COMMENCE OPERATION IN 1988 AND 1994, RESPECTIVELY.
LAKELAND UTILITIES MCINTOSH 3 NEW 364 MW (GROSS) 364 MW (ESC) COAL 2.56 %S BITUMINOUS LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 1/82	MCINTOSH 3 OF LAKELAND UTILITIES IS BEING CONSTRUCTED IN LAKELAND, FLORIDA. BABCOCK AND WILCOX HAS BEEN AWARDED A CONTRACT TO SUPPLY AN 85% EFFICIENT (SO2) LIMESTONE FGD SYSTEM FOR THIS UNIT. THE EMISSION CONTROL SYSTEM WILL CONSIST OF A COLD SIDE ESP FOLLOWED BY TWO PARALLEL FGD MODULES AND A 250 FOOT ACID BRICK LINED STACK. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP, AND THE POZ-O-TEC STABILIZED SLUDGE WILL BE USED AS A CONSTRUCTION BASE. CONSTRUCTION BEGAN IN NOVEMBER 1979 AND START-UP IS SCHEDULED TO BE IN JANUARY 1982.
LANSING BOARD OF WATER & LIGHT ERICKSON 2 NEW 160 MW (GROSS) 160 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 1/87	THE ERICKSON 2 STATION OF THE LANSING BOARD OF WATER AND LIGHT IS A PLANNED UNIT TO BE LOCATED IN DELTA TOWNSHIP, MICHIGAN. THE UNIT WILL HAVE A MW RATING OF BETWEEN 160 AND 250, DEPENDING ON WHETHER OTHER MUNICIPALITIES WILL JOIN IN THIS PROJECT. THE UTILITY IS PRESENTLY CONSIDERING THE USE OF FGD FOR EMISSION CONTROL. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1987.
LOS ANGELES DEPT OF WTR & PWR INTERMOUNTAIN 1 NEW 820 MW (GROSS) 820 MW (ESC) COAL .79 %S SUBBITUMINOUS LIME VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/86	THE LOS ANGELES DEPARTMENT OF WATER AND POWER HAS PLANS FOR FOUR NEW BOILERS, INTERMOUNTAIN 1, 2, 3 AND 4, TO BE LOCATED IN DELTA, UTAH. EACH 820 MW BOILER WILL FIRE PULVERIZED COAL (0.79% S, 10,200 BTU/LB) AND WILL SUPPLY 5,400,000 ACFM OF FLUE GAS TO A WET LIME SCRUBBING SYSTEM. A HORIZONTAL WEIR TYPE SCRUBBER ALONG WITH A HOT SIDE ESP IS UNDER CONSIDERATION BY THE UTILITY FOR EMISSION CONTROL. THE CLEANED FLUE GAS WILL EXIT A 750 FOOT STACK. UNIT 1 IS SCHEDULED TO COMMENCE OPERATIONS IN 1986.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
LOS ANGELES DEPT OF WTR & PWR INTERMOUNTAIN 2 NEW 820 MW (GROSS) 820 MW (ESC) COAL .79 %S SUBBITUMINOUS LIME VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/87	THE LOS ANGELES DEPARTMENT OF WATER AND POWER HAS PLANS FOR FOUR NEW BOILERS, INTERMOUNTAIN 1, 2, 3 AND 4, TO BE LOCATED IN DELTA, UTAH. EACH 820 MW BOILER WILL FIRE PULVERIZED COAL (0.79% S, 10,200 BTU/LB) AND WILL SUPPLY 5,400,000 ACFM OF FLUE GAS TO A WET LIME SCRUBBING SYSTEM. A HORIZONTAL WEIR TYPE SCRUBBER ALONG WITH A HOT SIDE ESP IS UNDER CONSIDERATION BY THE UTILITY FOR EMISSION CONTROL. THE CLEANED FLUE GAS WILL EXIT A 750 FOOT STACK. UNIT 2 IS SCHEDULED TO COMMENCE OPERATIONS IN 1987.
LOS ANGELES DEPT OF WTR & PWR INTERMOUNTAIN 3 NEW 820 MW (GROSS) 820 MW (ESC) COAL .79 %S SUBBITUMINOUS LIME VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/88	THE LOS ANGELES DEPARTMENT OF WATER AND POWER HAS PLANS FOR FOUR NEW BOILERS, INTERMOUNTAIN 1, 2, 3 AND 4, TO BE LOCATED IN DELTA, UTAH. EACH 820 MW BOILER WILL FIRE PULVERIZED COAL (0.79% S, 10,200 BTU/LB) AND WILL SUPPLY 5,400,000 ACFM OF FLUE GAS TO A WET LIME SCRUBBING SYSTEM. A HORIZONTAL WEIR TYPE SCRUBBER ALONG WITH A HOT SIDE ESP IS UNDER CONSIDERATION BY THE UTILITY FOR EMISSION CONTROL. THE CLEANED FLUE GAS WILL EXIT A 750 FOOT STACK. UNIT 3 IS SCHEDULED TO COMMENCE OPERATIONS IN 1988.
LOS ANGELES DEPT OF WTR & PWR INTERMOUNTAIN 4 NEW 820 MW (GROSS) 820 MW (ESC) COAL .79 %S SUBBITUMINOUS LIME VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/89	THE LOS ANGELES DEPARTMENT OF WATER AND POWER HAS PLANS FOR FOUR NEW BOILERS, INTERMOUNTAIN 1, 2, 3 AND 4, TO BE LOCATED IN DELTA, UTAH. EACH 820 MW BOILER WILL FIRE PULVERIZED COAL (0.79% S, 10,200 BTU/LB) AND WILL SUPPLY 5,400,000 ACFM OF FLUE GAS TO A WET LIME SCRUBBING SYSTEM. A HORIZONTAL WEIR TYPE SCRUBBER ALONG WITH A HOT SIDE ESP IS UNDER CONSIDERATION BY THE UTILITY FOR EMISSION CONTROL. THE CLEANED FLUE GAS WILL EXIT A 750 FOOT STACK. UNIT 4 IS SCHEDULED TO COMMENCE OPERATIONS IN 1989.
LOUISVILLE GAS & ELECTRIC CANE RUN 4 RETROFIT 188 MW (GROSS) 188 MW (ESC) COAL 3.75 %S BITUMINOUS LIME AMERICAN AIR FILTER ENERGY CONSUMPTION: 1.6% STATUS 1 STARTUP 8/76	UNIT 4 AT LOUISVILLE GAS AND ELECTRIC'S CANE RUN STATION IS A PULVERIZED BITUMINOUS COAL (3.75% S, 11,500 BTU/LB) FIRED UNIT IN LOUISVILLE, KENTUCKY. AN ESP AND TWO AMERICAN AIR FILTER CARBIDE LIME MOBILE BED ABSORBER MODULES (85% DESIGN SO2 REMOVAL) TREAT 734,000 ACFM OF FLUE GAS FROM THE BOILER. TWO CHEVRON MIST ELIMINATORS/MODULE ARE FOLLOWED BY A DIRECT COMBUSTION REHEATER AND A 250 FOOT STACK. THE WATER LOOP IS OPEN, AND THE SLUDGE IS DISPOSED IN AN ON-SITE LANDFILL. THIS RETROFIT SYSTEM HAS BEEN OPERATIONAL SINCE AUGUST 1976.
LOUISVILLE GAS & ELECTRIC CANE RUN 5 RETROFIT 200 MW (GROSS) 200 MW (ESC) COAL 3.75 %S BITUMINOUS LIME COMBUSTION ENGINEERING ENERGY CONSUMPTION: 1.5% STATUS 1 STARTUP 12/77	CANE RUN 5 OF LOUISVILLE GAS AND ELECTRIC IS A PULVERIZED BITUMINOUS COAL (3.75% S, 11,500 BTU/LB) FIRED UNIT LOCATED IN LOUISVILLE, KENTUCKY. THE BOILER SUPPLIES 700,000 ACFM OF FLUE GAS TO AN EMISSION CONTROL SYSTEM CONSISTING OF AN ESP FOLLOWED AND TWO COMBUSTION ENGINEERING 85% EFFICIENT (DESIGN) CARBIDE LIME SPRAY TOWERS. A STEAM TUBE REHEATER RAISES THE GAS TEMPERATURE 40 DEG F. THE SYSTEM OPERATES IN AN OPEN WATER LOOP MODE, AND THE SLUDGE IS POZ-O-TEC STABILIZED. OPERATION OF THIS RETROFIT SYSTEM BEGAN IN DECEMBER 1977.
LOUISVILLE GAS & ELECTRIC CANE RUN 6 RETROFIT 299 MW (GROSS) 299 MW (ESC) COAL 4.80 %S BITUMINOUS DUAL ALKALI THYSSEN/CEA ENERGY CONSUMPTION: 1.0% STATUS 1 STARTUP 4/79	LOUISVILLE GAS AND ELECTRIC'S CANE RUN 6 IS A 299-MW (GROSS) BITUMINOUS COAL (4.80% S, 11,500 BTU/LB) FIRED UNIT LOCATED IN LOUISVILLE, KENTUCKY. THYSSEN/CEA SUPPLIED A RETROFIT DUAL ALKALI DEMONSTRATION FGD SYSTEM FOR THIS UNIT. THE EMISSION CONTROL SYSTEM, DESIGNED TO REMOVE 95% OF THE FLUE GAS SO2, CONSISTS OF A COLD SIDE ESP AND TWO TRAY TOWER MODULES. THE CLEANED GAS PASSES THROUGH A CHEVRON MIST ELIMINATOR AND TWO DIRECT COMBUSTION REHEATERS BEFORE EXITING A 518 FOOT STACK. THE WATER LOOP IS OPEN, AND THE SLUDGE IS DISPOSED IN AN ON-SITE LANDFILL. FOR A ONE YEAR PERIOD FOLLOWING THE FIRST QUARTER OF OPERATION (WHICH BEGAN IN APRIL 1979), THE U.S.EPA WILL SUBSIDIZE A MAX OF $4.5 MM FOR OPERATION, R&D, AND REPORT WRITING (NOT APPLIED TO ANY CAPITAL EXPENDITURES).

UNIT IDENTIFICATION	ABSTRACT
LOUISVILLE GAS & ELECTRIC MILL CREEK 1 RETROFIT 358 MW (GROSS) 358 MW (ESC) COAL 3.75 %S BITUMINOUS LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: 1.4% STATUS 1 STARTUP 12/80	MILL CREEK 1 OF LOUISVILLE GAS AND ELECTRIC IS LOCATED IN LOUISVILLE, KENTUCKY. A RETROFIT LIME/LIMESTONE FGD SYSTEM IS PRESENTLY OPERATING ON THIS PULVERIZED COAL (3.75% S, 11,500 BTU/LB) FIRED UNIT. COMBUSTION ENGINEERING SUPPLIED THE LIME/LIMESTONE FGD SYSTEM WHICH IS SCHEDULED TO COMPLY WITH LOCAL EMISSION STANDARDS BY APRIL 1981.
LOUISVILLE GAS & ELECTRIC MILL CREEK 2 RETROFIT 350 MW (GROSS) 350 MW (ESC) COAL 3.75 %S BITUMINOUS LIME COMBUSTION ENGINEERING ENERGY CONSUMPTION: 1.4% STATUS 2 STARTUP 12/81	MILL CREEK 2 OF LOUISVILLE GAS AND ELECTRIC IS LOCATED IN LOUISVILLE, KENTUCKY. A RETROFIT LIME/LIMESTONE FGD SYSTEM IS PRESENTLY UNDER CONSTRUCTION ON THIS PULVERIZED COAL (3.75% S, 11,500 BTU/LB) FIRED UNIT. COMBUSTION ENGINEERING IS SUPPLYING THE LIME FGD SYSTEM WHICH WILL COMPLY WITH LOCAL EMISSION STANDARDS BY APRIL 1982.
LOUISVILLE GAS & ELECTRIC MILL CREEK 3 NEW 427 MW (GROSS) 427 MW (ESC) COAL 3.75 %S BITUMINOUS LIME AMERICAN AIR FILTER ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 8/78	LOUISVILLE GAS AND ELECTRIC'S MILL CREEK 3 IS A 3.75% S COAL (11,500 BTU/LB) FIRED UNIT LOCATED IN LOUISVILLE, KENTUCKY. AMERICAN AIR FILTER SUPPLIED A CARBIDE LIME FGD SYSTEM FOR THIS UNIT WHICH WAS DESIGNED TO REMOVE 85% OF THE SO2 FROM THE FLUE GAS. AN ESP IS FOLLOWED BY FOUR MOBILE BED CONTACTORS AND A STEAM TUBE REHEATER. THE WATER LOOP IS OPEN, AND THE FLYASH AND LIME STABILIZED SLUDGE IS PONDED. THIS UNIT HAS BEEN OPERATIONAL SINCE AUGUST 1978.
LOUISVILLE GAS & ELECTRIC MILL CREEK 4 NEW 495 MW (GROSS) 495 MW (ESC) COAL 3.75 %S LIME AMERICAN AIR FILTER ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 6/82	MILL CREEK 4 OF LOUISVILLE GAS AND ELECTRIC IS A PULVERIZED BITUMINOUS COAL (3.75% S, 11,500 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN LOUISVILLE, KENTUCKY. THE EMISSION CONTROL SYSTEM WILL CONSIST OF AN ESP AND FOUR MOBILE BED CONTACTORS. THE SYSTEM'S WATER LOOP WILL BE CLOSED, AND THE SLUDGE WILL BE STABILIZED WITH LIME AND FLYASH. STEAM TUBES WILL PROVIDE REHEAT OF THE CLEANED GASES. THE SYSTEM IS SCHEDULED TO START-UP IN JUNE 1982.
LOUISVILLE GAS & ELECTRIC PADDY'S RUN 6 RETROFIT 72 MW (GROSS) 72 MW (ESC) COAL 2.50 %S BITUMINOUS LIME COMBUSTION ENGINEERING ENERGY CONSUMPTION: 2.8% STATUS 1 STARTUP 4/73	UNIT 6 AT LOUISVILLE GAS AND ELECTRIC'S PADDY'S RUN STATION IS A DRY BOTTOM PULVERIZED COAL (2.5% S, 11,500 BTU/LB) FIRED UNIT IN LOUISVILLE, KENTUCKY. A RETROFIT CARBIDE LIME FGD SYSTEM BY COMBUSTION ENGINEERING TREATS 400,000 ACFM OF FLUE GAS FROM THE BOILER. AN ESP IS FOLLOWED BY TWO MARBLE BED ABSORBERS, A DIRECT COMBUSTION REHEATER, AND A 250 FOOT STACK. MIST ELIMINATION IS PROVIDED BY ONE CHEVRON/MODULE. THE LIME FIXATED SLUDGE IS TRUCKED TO AN UNLINED POND, AND THE WATER LOOP IS CLOSED. THE FGD SYSTEM BEGAN INITIAL OPERATIONS IN APRIL 1973.
LOUISVILLE GAS & ELECTRIC TRIMBLE COUNTY 1 NEW 575 MW (GROSS) 575 MW (ESC) COAL 4.00 %S BITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 5 STARTUP 7/85	LOUISVILLE GAS AND ELECTRIC WILL BE INSTALLING FGD SYSTEMS ON TWO OF THE FOUR BOILERS AT THE UTILITY'S PLANNED TRIMBLE COUNTY STATION IN BEDFORD, KENTUCKY. THE PULVERIZED 4% S (IF NO COAL WASH IS INCLUDED) COAL FIRED UNITS' FLUE GAS WILL BE CLEANED BY ESP'S AND WET SCRUBBING (90% REMOVAL EFFICIENCY). SLUDGE DISPOSAL STRATEGY IS UNDECIDED. UNIT 1 IS SCHEDULED FOR START-UP IN JULY 1985.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
LOUISVILLE GAS & ELECTRIC TRIMBLE COUNTY 2 NEW 575 MW (GROSS) 575 MW (ESC) COAL 4.00 %S BITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 5 STARTUP 7/89	LOUISVILLE GAS AND ELECTRIC WILL BE INSTALLING FGD SYSTEMS ON TWO OF THE FOUR BOILERS AT THE UTILITY'S PLANNED TRIMBLE COUNTY STATION IN BEDFORD, KENTUCKY. THE PULVERIZED 4% S (IF NO COAL WASH IS INCLUDED) COAL FIRED UNITS' FLUE GAS WILL BE CLEANED BY ESP'S AND WET SCRUBBING (90% REMOVAL EFFICIENCY). SLUDGE DISPOSAL STRATEGY IS UNDECIDED. UNIT 2 IS SCHEDULED FOR START-UP IN 1989.
LOWER COLORADO RIVER AUTH FAYETTE POWER PROJECT 3 NEW 435 MW (GROSS) 435 MW (ESC) LIGNITE 1.70 %S LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: 2.8% STATUS 6 STARTUP 0/88	LOWER COLORADO RIVER AUTHORITY HAS PLANS TO CONSTRUCT A 435 MW UNIT, FAYETTE POWER PROJECT 3, TO BE LOCATED IN LA GRANGE, TEXAS. THE LIGNITE (1.7% S, 4300 BTU/LB) FIRED BOILER WILL UTILIZE A WET LIMESTONE SCRUBBING SYSTEM DESIGNED TO REMOVE 90% SO2. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1988.
MARQUETTE BOARD OF LIGHT & PWR SHIRAS 3 NEW 44 MW (GROSS) 44 MW (ESC) COAL ***** %S LIME/SPRAY DRYING GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 9/82	SHIRAS 3 OF THE MARQUETTE BOARD OF LIGHT AND POWER IS A PULVERIZED COAL FIRED BOILER UNDER CONSTRUCTION IN MARQUETTE, MICHIGAN. THE UTILITY HAS AWARDED A CONTRACT TO GE ENVIRONMENTAL SERVICES FOR A LIME/SPRAY DRYING PROCESS TO CONTROL EMISSIONS. THE SYSTEM WILL UTILIZE A FABRIC FILTER TO OBTAIN A PARTICLE REMOVAL EFFICIENCY OF 99.8%. THE UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN SEPTEMBER 1982.
MICHIGAN SO CENTRAL PWR AGENCY PROJECT 1 NEW 55 MW (GROSS) 55 MW (ESC) COAL 2.25 %S BITUMINOUS LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: 1.8% STATUS 2 STARTUP 6/82	THE PROJECT 1 UNIT OF MICHIGAN SOUTH CENTRAL POWER AGENCY IS UNDER CONSTRUCTION IN LITCHFIELD, MICHIGAN, AND WILL UTILIZE A WET LIMESTONE FGD PROCESS. THE PULVERIZED COAL FIRED BOILER WILL FEED ITS FLUE GAS THROUGH A HOT SIDE ESP FOLLOWED BY A BABCOCK AND WILCOX LIMESTONE SPRAY TOWER. THE CLEANED GAS WILL PASS THROUGH A MIST ELIMINATOR BEFORE BEING HEATED BY AN IN-LINE REHEATER AND EXITING A 250 FOOT STACK. THE SLUDGE IS TO BE DISPOSED OFF SITE. START-UP IS SCHEDULED FOR JUNE 1982.
MIDDLE SOUTH UTILITIES ARKANSAS LIGNITE 5 NEW 890 MW (GROSS) 890 MW (ESC) COAL .50 %S LIGNITE LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 0/90	UNIT 1 OF THE ARKANSAS ENERGY LIGNITE CENTER IS A LIGNITE (.5% S) FIRED BOILER. MIDDLE SOUTH UTILITIES HAS SIGNED A LETTER OF INTENT WITH COMBUSTION ENGINEERING FOR A WET LIMESTONE SCRUBBING SYSTEM TO CONTROL EMISSIONS. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1990.
MIDDLE SOUTH UTILITIES ARKANSAS LIGNITE 6 NEW 890 MW (GROSS) 890 MW (ESC) COAL .50 %S LIGNITE LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 0/92	UNIT 2 OF THE ARKANSAS ENERGY LIGNITE CENTER IS A LIGNITE (.5% S) FIRED BOILER. MIDDLE SOUTH UTILITIES HAS SIGNED A LETTER OF INTENT WITH COMBUSTION ENGINEERING FOR A WET LIMESTONE SCRUBBING SYSTEM TO CONTROL EMISSIONS. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1992.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
MIDDLE SOUTH UTILITIES UNASSIGNED 1 NEW 890 MW (GROSS) 890 MW (ESC) COAL .50 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 0/89	MIDDLE SOUTH UTILITIES HAS SIGNED A LETTER OF INTENT WITH COMBUSTION ENGINEERING FOR A WET LIMESTONE SCRUBBING SYSTEM TO CONTROL EMISSIONS. THE PLANT NAME HAS NOT BEEN ASSIGNED. THE PLANT WILL BE LOCATED SOMEWHERE IN LOUISIANA. START-UP IS SCHEDULED FOR 1989.
MIDDLE SOUTH UTILITIES UNASSIGNED 2 NEW 890 MW (GROSS) 890 MW (ESC) COAL .50 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 0/93	MIDDLE SOUTH UTILITIES HAS SIGNED A LETTER OF INTENT WITH COMBUSTION ENGINEERING FOR A WET LIMESTONE SCRUBBING SYSTEM TO CONTROL EMISSIONS. THE PLANT NAME HAS NOT BEEN ASSIGNED. THE PLANT WILL BE LOCATED SOMEWHERE IN LOUISIANA. START-UP IS SCHEDULED FOR 1993.
MIDDLE SOUTH UTILITIES WILTON 1 NEW 890 MW (GROSS) 890 MW (ESC) COAL .50 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 0/88	WILTON 1 IS A COAL (.50% S) FIRED BOILER TO BE LOCATED IN CONVENT, LOUISIANA. MIDDLE SOUTH UTILITIES HAS SIGNED A LETTER OF INTENT WITH COMBUSTION ENGINEERING FOR A WET LIMESTONE SCRUBBING SYSTEM FOR EMISSION CONTROL. START-UP IS SCHEDULED FOR 1988.
MIDDLE SOUTH UTILITIES WILTON 2 NEW 890 MW (GROSS) 890 MW (ESC) COAL .50 %S LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 0/91	WILTON 2 IS A COAL (.50% S) FIRED BOILER TO BE LOCATED IN CONVENT, LOUISIANA. MIDDLE SOUTH UTILITIES HAS SIGNED A LETTER OF INTENT WITH COMBUSTION ENGINEERING FOR A WET LIMESTONE SCRUBBING SYSTEM FOR EMISSION CONTROL. START-UP IS SCHEDULED FOR 1991.
MINNESOTA POWER & LIGHT CLAY BOSWELL 4 NEW 554 MW (GROSS) 475 MW (ESC) COAL .94 %S SUBBITUMINOUS LIME/ALKALINE FLYASH PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: 1.3% STATUS 1 STARTUP 4/80	CLAY BOSWELL 4 OF MINNESOTA POWER AND LIGHT IS A SUBBITUMINOUS COAL (0.94% S, 8896 BTU/LB) FIRED UNIT LOCATED IN COHASSET, MINNESOTA. PEABODY PROCESS SYSTEMS HAS SUPPLIED A LIME/ALKALINE FLYASH SYSTEM WHICH IS DESIGNED TO REMOVE 84.6% OF THE SO2 IN THE FLUE GAS. TWO HOT SIDE ESP'S ARE FOLLOWED BY VENTURI/SPRAY TOWER TRAINS. MIST ELIMINATION IS PROVIDED BY A SIEVE TRAY FOLLOWED BY A SPIN VANE CHEVRON, AND REHEAT IS SUPPLIED BY BYPASSING 5% OF THE FLUE GAS. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE, AND THE SLUDGE IS DISPOSED IN A LINED POND. OPERATIONS COMMENCED IN APRIL 1980.
MINNKOTA POWER MILTON R. YOUNG 2 NEW 440 MW (GROSS) 185 MW (ESC) COAL .70 %S LIGNITE LIME/ALKALINE FLYASH THYSSEN/CEA ENERGY CONSUMPTION: 1.6% STATUS 1 STARTUP 9/77	MINNKOTA POWER COOPERATIVE'S MILTON R. YOUNG 2 IS A CYCLONE FIRED LIGNITE (0.70%S, 6500 BTU/LB) BOILER LOCATED IN CENTER, NORTH DAKOTA. THE BOILER PRODUCES 2,021,400 ACFM OF FLUE GAS, HALF OF WHICH IS CLEANED BY TWO ESP'S AND TWO THYSSEN/CEA LIME/ALKALINE FYLASH SPRAY TOWERS (75% DESIGN SO2 REMOVAL EFFICIENCY). THE CLEANED GAS PASSES THROUGH A CHEVRON MIST ELIMINATOR BEFORE IT JOINS A 15% BYPASS REHEAT, ALONG WITH THE UNSCRUBBED GAS, EXITS A 550 FOOT STACK. THE WATER LOOP IS OPEN, AND TH SLUDGE IS TRUCKED TO AN OFF-SITE MINEFILL. OPERATIONS BEGAN IN 1977.

UNIT IDENTIFICATION	ABSTRACT
MONONGAHELA POWER PLEASANTS 1 NEW 618 MW (GROSS) 618 MW (ESC) COAL 3.00 %S BITUMINOUS LIME BABCOCK & WILCOX ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 3/79	MONONGAHELA POWER PLEASANTS 1 IS A BITUMINOUS COAL (3.70% S, 12,150 BTU/LB) FIRED BOILER IN BELMONT, WEST VIRGINIA. BABCOCK AND WILCOX SUPPLIED A LIME FGD SYSTEM DESIGNED TO REMOVE 90% OF THE FLUE GAS SO2 FROM THIS UNIT. THE EMISSION CONTROL SYSTEM INCLUDES AN ESP UPSTREAM OF FOUR SPRAY TOWER ABSORBERS. A FLUE GAS BYPASS SYSTEM PROVIDES REHEAT OF THE CLEANED GAS BEFORE IT IS DISCHARGED THROUGH A 1200 FOOT PLACITE LINED STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP. THE FGD SYSTEM ON THIS UNIT HAS BEEN OPERATIONAL SINCE MARCH 1979.
MONONGAHELA POWER PLEASANTS 2 NEW 618 MW (GROSS) 618 MW (ESC) COAL 3.00 %S BITUMINOUS LIME BABCOCK & WILCOX ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 10/80	MONONGAHELA POWER PLEASANTS 2 IS A BITUMINOUS COAL (4.5% S, 12150 BTU/LB) FIRED BOILER LOCATED IN BELMONT, WEST VIRGINIA. BABCOCK AND WILCOX SUPPLIED A LIME FGD SYSTEM DESIGNED TO REMOVE 90% OF THE BOILER FLUE GAS SO2. THE EMISSION CONTROL SYSTEM ON THIS UNIT INCLUDES AN ESP UPSTREAM OF FOUR SPRAY TOWER ABSORBERS. A FLUE GAS BYPASS SYSTEM PROVIDES REHEAT OF THE CLEANED GAS BEFORE IT IS DISCHARGED THROUGH A 1200 FOOT PLACITE LINED STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP. THE FGD SYSTEM OPERATION COMMENCED IN OCTOBER 1980.
MONTANA POWER COLSTRIP 1 NEW 360 MW (GROSS) 360 MW (ESC) COAL .77 %S SUBBITUMINOUS LIME/ALKALINE FLYASH THYSSEN/CEA ENERGY CONSUMPTION: 3.3% STATUS 1 STARTUP 9/75	COLSTRIP 1 OF MONTANA POWER IS A 360-MW (GROSS) SUBBITUMINOUS COAL (0.77% S, 8843 BTU/LB) FIRED UNIT LOCATED IN COLSTRIP, MONTANA. THYSSEN CEA SUPPLIED A LIME/ALKALINE FLYASH FGD SYSTEM CONSISTING OF THREE VENTURI SCRUBBER/SPRAY TOWER ABSORBER TRAINS. THE ABSORBERS ARE FOLLOWED BY HORIZONTAL CHEVRON MIST ELIMINATORS, A STEAM TUBE REHEATER, AND A 500 FOOT STACK. THE UNSTABILIZED SLUDGE IS DISPOSED IN AN ON-SITE LINED POND. THE WATER LOOP IS CLOSED. OPERATIONS INITIALLY BEGAN IN SEPTEMBER 1975.
MONTANA POWER COLSTRIP 2 NEW 360 MW (GROSS) 360 MW (ESC) COAL .77 %S SUBBITUMINOUS LIME/ALKALINE FLYASH THYSSEN/CEA ENERGY CONSUMPTION: 3.3% STATUS 1 STARTUP 5/76	COLSTRIP 2 OF MONTANA POWER IS A 360-MW (GROSS) SUBBITUMINOUS COAL (0.77% S, 8843 BTU/LB) FIRED UNIT LOCATED IN COLSTRIP, MONTANA. THYSSEN CEA SUPPLIED A LIME/ALKALINE FLYASH FGD SYSTEM CONSISTING OF THREE VENTURI SCRUBBER/SPRAY TOWER ABSORBER TRAINS. THE ABSORBERS ARE FOLLOWED BY HORIZONTAL CHEVRON MIST ELIMINATORS, A STEAM TUBE REHEATER, AND A 500 FOOT STACK. THE UNSTABILIZED SLUDGE IS DISPOSED IN AN ON-SITE LINED POND. THE WATER LOOP IS CLOSED. OPERATIONS INITIALLY BEGAN IN MAY 1976.
MONTANA POWER COLSTRIP 3 NEW 700 MW (GROSS) 700 MW (ESC) COAL .70 %S LIME/ALKALINE FLYASH THYSSEN/CEA ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 10/83	MONTANA POWER'S COLSTRIP 3 IS A LOW SULFUR COAL (0.7% S, 8800 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN COLSTRIP, MONTANA. A CONTRACT HAS BEEN AWARDED TO THYSSEN/CEA FOR A LIME/ALKALINE FLYASH FGD SYSTEM ON THIS UNIT. START UP IS SCHEDULED FOR OCTOBER 1983.
MONTANA POWER COLSTRIP 4 NEW 700 MW (GROSS) 700 MW (ESC) COAL .70 %S LIME/ALKALINE FLYASH THYSSEN/CEA ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 0/84	MONTANA POWER'S COLSTRIP 4 IS A LOW SULFUR COAL (0.7% S, 8800 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN COLSTRIP, MONTANA. A CONTRACT HAS BEEN AWARDED TO THYSSEN/CEA FOR A LIME/ALKALINE FLYASH FGD SYSTEM ON THIS UNIT. START UP IS SCHEDULED FOR 1984.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
MONTANA-DAKOTA UTILITIES COYOTE 1 NEW 440 MW (GROSS) 440 MW (ESC) COAL .87 %S LIGNITE SODIUM CARBONATE/SPRAY DRYING WHEELABRATOR FRYE/R.I. ENERGY CONSUMPTION: 1.1% STATUS 1 STARTUP 4/81	COYOTE 1 IS A CYCLONE FIRED PULVERIZED LIGNITE (0.87% S, 7050 BTU/LB) BOILER OPERATING IN BEULAH, NORTH DAKOTA. THIS UNIT IS JOINTLY OWNED BY FIVE UTILITIES, WITH MONTANA-DAKOTA UTILITIES BEING THE MAJOR OWNER AND CONSTRUCTOR. AN AQUEOUS CARBONATE DRY FGD SYSTEM DESIGNED TO REMOVE 70% OF THE SO2 WAS SUPPLIED BY WHEELABRATOR-FRYE AND ROCKWELL INTERNATIONAL. THE SPRAY DRYER/BAGHOUSE SYSTEM COMMENCED OPERATION IN APRIL 1981.
MUSCATINE POWER & WATER MUSCATINE 9 NEW 166 MW (GROSS) 166 MW (ESC) COAL 3.21 %S BITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 4.8% STATUS 2 STARTUP 9/82	MUSCATINE 9 IS A PULVERIZED BITUMINOUS COAL (3.21% S, 11,200 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN MUSCATINE, IOWA. RESEARCH-COTTRELL IS SUPPLYING A LIMESTONE SCRUBBING SYSTEM FOR EMISSION CONTROL. THE FGD SYSTEM WILL FEATURE AN ESP, TWO 100% CAPACITY TOWERS, STEAM COIL REHEAT, A CLOSED WATER LOOP, AND FORCED OXIDATION OF THE SLUDGE BEFORE LANDFILL. THE DESIGN SO2 REMOVAL WILL BE 94%. START-UP IS SCHEDULED TO TAKE PLACE IN 1982.
NEBRASKA PUBLIC POWER DISTRICT FOSSIL III 1 NEW 650 MW (GROSS) 650 MW (ESC) COAL .36 %S SUBBITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 3/92	FOSSIL III 1 IS A PULVERIZED SUBBITUMINOUS COAL (0.36% S, 8000 BTU/LB) FIRED UNIT PLANNED BY THE NEBRASKA PUBLIC POWER DISTRICT TO BE LOCATED NEAR SARGENT, NEBRASKA. THE UTILITY IS CONSIDERING A DRY SCRUBBING FGD PROCESS TO CONTROL EMISSIONS FROM THE 650 MW BOILER. START-UP FOR THE UNIT IS TENTATIVELY SCHEDULED FOR MARCH 1992.
NEVADA POWER HARRY ALLEN 1 NEW 500 MW (GROSS) 500 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 6/86	NEVADA POWER'S HARRY ALLEN 1 IS A PLANNED COAL FIRED UNIT TO BE LOCATED IN LAS VEGAS, NEVADA. THE UTILITY IS CONSIDERING A HOT SIDE ESP IN CONJUNCTION WITH AN FGD SYSTEM. SPECIFICATIONS HAVE NOT YET BEEN PREPARED. START-UP IS SCHEDULED FOR JUNE 1986.
NEVADA POWER HARRY ALLEN 2 NEW 500 MW (GROSS) 500 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 6/87	NEVADA POWER'S HARRY ALLEN 2 IS A PLANNED COAL FIRED UNIT TO BE LOCATED IN LAS VEGAS, NEVADA. THE UTILITY IS CONSIDERING A HOT SIDE ESP IN CONJUNCTION WITH AN FGD SYSTEM. SPECIFICATIONS HAVE NOT YET BEEN PREPARED. START-UP IS SCHEDULED FOR JUNE 1987.
NEVADA POWER HARRY ALLEN 3 NEW 500 MW (GROSS) 500 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 6/88	NEVADA POWER'S HARRY ALLEN 3 IS A PLANNED COAL FIRED UNIT TO BE LOCATED IN LAS VEGAS, NEVADA. THE UTILITY IS CONSIDERING A HOT SIDE ESP IN CONJUNCTION WITH AN FGD SYSTEM. SPECIFICATIONS HAVE NOT YET BEEN PREPARED. START-UP IS SCHEDULED FOR JUNE 1988.

UNIT IDENTIFICATION	ABSTRACT
NEVADA POWER HARRY ALLEN 4 NEW 500 MW (GROSS) 500 MW (ESC) COAL ***** %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 6/89	NEVADA POWER'S HARRY ALLEN 4 IS A PLANNED COAL FIRED UNIT TO BE LOCATED IN LAS VEGAS, NEVADA. THE UTILITY IS CONSIDERING A HOT SIDE ESP IN CONJUNCTION WITH AN FGD SYSTEM. SPECIFICATIONS HAVE NOT YET BEEN PREPARED. START-UP IS SCHEDULED FOR JUNE 1989.
NEVADA POWER REID GARDNER 1 RETROFIT 125 MW (GROSS) 125 MW (ESC) COAL .50 %S BITUMINOUS SODIUM CARBONATE THYSSEN/CEA ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 3/74	REID GARDNER 1 IS A 125-MW (GROSS) WET BOTTOM LOW SULFUR COAL (0.5% S, 12,450 BTU/LB) FIRED UNIT OWNED BY NEVADA POWER, LOCATED IN MOAPA, NEVADA. A SODIUM CARBONATE-BASED (TRONA) SCRUBBING SYSTEM BY THYSSEN/CEA CONSISTS OF ONE MODULE CONTAINING TWIN VARIABLE THROAT VENTURIS FOLLOWED BY A SEPARATOR IN SERIES WITH A SINGLE STAGE PEFORATED PLATE WASH TOWER. PRIMARY PARTICULATE CONTROL IS PROVIDED BY UPSTREAM MULTICLONES. A RADIAL VANE MIST ELIMINATOR PRECEDES AN INDIRECT STEAM HOT AIR REHEATER AND A 200 FOOT STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP, AND THE SLUDGE IS DISPOSED IN AN ON-SITE CLAY LINED SOLAR EVAPORATION POND. THE DESIGN SO2 REMOVAL EFFICIENCY IS 90%. THE SYSTEM HAS BEEN OPERATIONAL SINCE MARCH 1974.
NEVADA POWER REID GARDNER 2 RETROFIT 125 MW (GROSS) 125 MW (ESC) COAL .50 %S BITUMINOUS SODIUM CARBONATE THYSSEN/CEA ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 4/74	REID GARDNER 2 IS A 125-MW (GROSS) WET BOTTOM LOW SULFUR COAL (0.5% S, 12,450 BTU/LB) FIRED UNIT OWNED BY NEVADA POWER, LOCATED IN MOAPA, NEVADA. A SODIUM CARBONATE-BASED (TRONA) SCRUBBING SYSTEM BY THYSSEN/CEA CONSISTS OF ONE MODULE CONTAINING TWIN VARIABLE THROAT VENTURIS FOLLOWED BY A SEPARATOR IN SERIES WITH A SINGLE STAGE PEFORATED PLATE WASH TOWER. PRIMARY PARTICULATE CONTROL IS PROVIDED BY UPSTREAM MULTICLONES. A RADIAL VANE MIST ELIMINATOR PRECEDES AN INDIRECT STEAM HOT AIR REHEATER AND A 200 FOOT STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP, AND THE SLUDGE IS DISPOSED IN AN ON-SITE CLAY LINED SOLAR EVAPORATION POND. THE DESIGN SO2 REMOVAL EFFICIENCY IS 90%. THE SYSTEM HAS BEEN OPERATIONAL SINCE APRIL 1974.
NEVADA POWER REID GARDNER 3 NEW 125 MW (GROSS) 125 MW (ESC) COAL .50 %S BITUMINOUS SODIUM CARBONATE THYSSEN/CEA ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 6/76	REID GARDNER 3 IS A 125-MW (GROSS) WET BOTTOM LOW SULFUR COAL (0.5% S, 12,450 BTU/LB) FIRED UNIT OWNED BY NEVADA POWER, LOCATED IN MOAPA, NEVADA. A SODIUM CARBONATE-BASED (TRONA) SCRUBBING SYSTEM BY THYSSEN/CEA CONSISTS OF ONE MODULE CONTAINING TWIN VARIABLE THROAT VENTURIS FOLLOWED BY A SEPARATOR IN SERIES WITH A SINGLE STAGE PEFORATED PLATE WASH TOWER. PRIMARY PARTICULATE CONTROL IS PROVIDED BY UPSTREAM MULTICLONES. A RADIAL VANE MIST ELIMINATOR PRECEDES AN INDIRECT STEAM HOT AIR REHEATER AND A 200 FOOT STACK. THE SYSTEM OPERATES IN AN OPEN WATER LOOP, AND THE SLUDGE IS DISPOSED IN AN ON-SITE CLAY LINED SOLAR EVAPORATION POND. THE DESIGN SO2 REMOVAL EFFICIENCY IS 90%. THE SYSTEM HAS BEEN OPERATIONAL SINCE JUNE 1976.
NEVADA POWER REID GARDNER 4 NEW 250 MW (GROSS) 250 MW (ESC) COAL .75 %S SODIUM CARBONATE THYSSEN/CEA ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 4/83	REID GARDNER 4 OF NEVADA POWER IS A COAL (0.75% S, 12,450 BTU/LB) FIRED UNIT PLANNED FOR LOCATION IN MOAPA, NEVADA. A LETTER OF INTENT HAS BEEN SIGNED WITH THYSSEN/CEA TO PROVIDE A SODIUM CARBONATE FGD SYSTEM. A BAGHOUSE WILL PRECEED THE FGD SYSTEM FOR PARTICULATE MATTER CONTROL SCHEDULED START-UP OF THIS 250-MW (GROSS) UNIT IS EXPECTED IN APRIL 1983.
NEW YORK STATE ELEC & GAS SOMERSET 1 NEW 625 MW (GROSS) 625 MW (ESC) COAL 2.20 %S BITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: ****% STATUS 4 STARTUP 6/84	THE NEW YORK STATE ELECTRIC & GAS CORP. HAS PLANS TO BUILD A PULVERIZED COAL FIRED BOILER IN SOMERSET, NEW YORK. THE BOILER IS TO GENERATE A FLUE GAS FLOW OF 2,227,000 ACFM AND BURN A BITUMINOUS COAL WITH AN AVERAGE SULFUR CONTENT OF 2.2% AND AN AVERAGE HEAT CONTENT OF 12,000 BTU/LB. A COLD SIDE ESP WITH A DESIGN EFFICIENCY OF 99.77% WILL PROVIDE THE PRIMARY PARTICULATE REMOVAL. A LIMESTONE ABSORBER WITH A DESIGN REMOVAL EFFICIENCY OF 90% WILL BE USED FOR SO2 REMOVAL. THE SYSTEM WILL OPERATE IN A CLOSED LOOP MODE. THE SLUDGE IS TO BE DEWATERED AND STABILIZED BEFORE BEING LANDFILLED. OPERATIONS ARE SCHEDULED FOR 1984.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
NIAGARA MOHAWK POWER CHARLES R. HUNTLEY 66 RETROFIT 100 MW (GROSS) 100 MW (ESC) COAL 1.80 %S AQUEOUS CARBONATE/SPRAY DRYING ROCKWELL INTERNATIONAL ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 4/82	CHARLES R. HUNTLEY 66 OF NIAGARA POWER COOP IS A PULVERIZED COAL (1.8% S, 12,500 BTU/LB) FIRED UNIT LOCATED IN BUFFALO, NEW YORK. A CONTRACT WAS AWARDED TO ROCKWELL INTERNATIONAL FOR THE DESIGN AND INSTALLATION OF A 90% EFFICIENT RETROFIT AQUEOUS CARBONATE FGD SYSTEM WHICH WILL PRODUCE ELEMENTAL SULFUR AS AN END PRODUCT. FUNDS ARE BEING PROVIDED BY THE U.S.EPA AND THE EMPIRE STATE ELECTRIC ENERGY RESEARCH CORP. A SPRAY DRYER WILL BE FOLLOWED BY TWO BANKS OF 8 CYCLONES, AN ESP, AND A 200 FOOT STEEL LINED STACK. THE WATER LOOP WILL BE OPEN. START-UP OF THE FGD SYSTEM WILL BE IN 1982.
NORTHERN INDIANA PUB SERVICE DEAN H. MITCHELL 11 RETROFIT 116 MW (GROSS) 115 MW (ESC) COAL 3.50 %S WELLMAN LORD DAVY MCKEE ENERGY CONSUMPTION: 12.1% STATUS 1 STARTUP 7/76	NORTHERN INDIANA PUBLIC SERVICE'S DEAN H. MITCHELL 11 IS A COAL (3.5% S, 11,000 BTU/LB) FIRED UNIT LOCATED IN GARY, INDIANA. A RETROFIT WELLMAN LORD FGD SYSTEM BY DAVY POWERGAS HAS BEEN OPERATING ON THIS UNIT SINCE JULY 1976. AN ESP IS FOLLOWED BY A VARIABLE THROAT VENTURI SCRUBBER AND A TRAY TOWER ABSORBER (90% DESIGN SO2 REMOVAL EFFICIENCY). A DIRECT COMBUSTION RAISES THE CLEANED GAS TEMPERATURE 50 DEG F BEFORE THE GAS IS DISCHARGED THROUGH A 168 FOOT STAINLESS STEEL AND FRP LINED STACK. ELEMENTAL SULFUR AND SULFATE IS PRODUCED BY THE PROCESS DEVELOPED BY ALLIED CHEMICAL. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE.
NORTHERN INDIANA PUB SERVICE SCHAHFER 17 NEW 421 MW (GROSS) 421 MW (ESC) COAL 3.20 %S BITUMINOUS DUAL ALKALI FMC ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 6/83	SCHAHFER 17 OF NORTHERN INDIANA PUBLIC SERVICE IS A 3.2% SULFUR COAL FIRED UNIT UNDER CONSTRUCTION IN WHEATFIELD, INDIANA. FMC IS INSTALLING A DUAL ALKALI FGD SYSTEM FOR SO2 EMISSION CONTROL. PARTICULATE MATTER WILL BE COLLECTED BY AN ESP AND THE SYSTEM WILL INCLUDE A REHEATER. START-UP OF THIS UNIT IS SCHEDULED FOR JUNE 1983.
NORTHERN INDIANA PUB SERVICE SCHAHFER 18 NEW 421 MW (GROSS) 421 MW (ESC) COAL 3.20 %S BITUMINOUS DUAL ALKALI FMC ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 6/85	SCHAHFER 18 OF NORTHERN INDIANA PUBLIC SERVICE IS A 3.2% SULFUR COAL FIRED UNIT PLANNED FOR CONSTRUCTION IN WHEATFIELD, INDIANA. THE UTILITY HAS AWARDED A CONTRACT TO FMC FOR THE INSTALLATION OF A DUAL ALKALI FGD SYSTEM AT THIS UNIT. PARTICULATE MATTER WILL BE COLLECTED BY AN ESP AND THE SYSTEM WILL INCLUDE A REHEATER. START-UP OF THIS UNIT IS SCHEDULED FOR JUNE 1985.
NORTHERN STATES POWER METRO COAL 1 NEW 200 MW (GROSS) 200 MW (ESC) COAL 1.00 %S SUBBITUMINOUS LIME VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/90	NORTHERN STATES POWER HAS PLANS TO CONSTRUCT A 190 MW (NET) PULVERIZED COA (1.0% S, 8700 BTU/LB) FIRED UNIT, METRO COAL 1. THE UNIT IS TO UTILIZE A LIME SPRAY DRYING SYSTEM ALONG WITH FABRIC FILTERS TO CONTROL EMISSIONS. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1990.
NORTHERN STATES POWER RIVERSIDE 6-7 RETROFIT 110 MW (GROSS) 110 MW (ESC) COAL 1.20 %S SUBBITUMINOUS LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 11/80	RIVERSIDE 6 AND 7 ARE TWO COAL FIRED BOILERS OWNED BY NORTHERN STATES POWER AND LOCATED IN MINNEAPOLIS, MINNESOTA. EACH BOILER GENERATES A FLUE GAS FLOW OF 340,000 ACFM AT 350 F. CURRENTLY, A DEMONSTRATION LIME/SPRAY DRYING FGD SYSTEM THAT IS CAPABLE OF TREATING THE FLUE GAS FROM BOTH BOILERS IS BEING TESTED AT THIS UNIT. THE SYSTEM WAS SUPPLIED BY NIRO ATOMIZER/JOY MANUFACTURING AND CONSIST OF A SPRAY DRYER FOLLOWED BY A BAGHOUSE. THE CLEAN FLUE GAS IS VENTED TO TWO 275 FT CONCRETE STACKS WITH FIRE BRICK LINERS. SPENT ABSORBENT IS BEING DISPOSED OF IN ON AND OFF SITE LANDFILLS. OPERATIONS COMMENCED IN NOVEMBER 1980.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
NORTHERN STATES POWER SHERBURNE 1 NEW 740 MW (GROSS) 740 MW (ESC) COAL .80 %S SUBBITUMINOUS LIMESTONE/ALKALINE FLYASH COMBUSTION ENGINEERING ENERGY CONSUMPTION: 2.7% STATUS 1 STARTUP 3/76	NORTHERN STATES POWER'S SHERBURNE 1 IS A BALANCED DRAFT PULVERIZED SUBBITUMINOUS COAL (0.80% S, 8500 BTU/LB) FIRED BOILER IN BECKER, MINNESOTA. A 50% EFFICIENT (DESIGN) LIMESTONE/ALKALINE FLYASH FGD SYSTEM SUPPLIED BY COMBUSTION ENGINEERING HAS BEEN OPERATIONAL ON THIS UNIT SINCE MARCH 1976. TWELVE VARIABLE THROAT ROD DECK VENTURI/MARBLE BED ABSORBER TRAINS ARE FOLLOWED BY ONE CHEVRON MIST ELIMINATORS/TRAIN, AN IN-LINE HOT WATER REHEATER, AND A 650 FOOT CORTEN LINED STACK. THE SLUDGE IS FORCIBLY OXIDIZED AND DISPOSED IN A CLAY LINED SETTLING POND. THE WATER LOOP IS OPEN.
NORTHERN STATES POWER SHERBURNE 2 NEW 740 MW (GROSS) 740 MW (ESC) COAL .80 %S SUBBITUMINOUS LIMESTONE/ALKALINE FLYASH COMBUSTION ENGINEERING ENERGY CONSUMPTION: 2.7% STATUS 1 STARTUP 3/77	NORTHERN STATES POWER'S SHERBURNE 2 IS A BALANCED DRAFT PULVERIZED SUBBITUMINOUS COAL (0.80% S, 8500 BTU/LB) FIRED BOILER IN BECKER, MINNESOTA. A 50% EFFICIENT (DESIGN) LIMESTONE/ALKALINE FLYASH FGD SYSTEM SUPPLIED BY COMBUSTION ENGINEERING HAS BEEN OPERATIONAL ON THIS UNIT SINCE MARCH 1977. TWELVE VARIABLE THROAT ROD DECK VENTURI/MARBLE BED ABSORBER TRAINS ARE FOLLOWED BY ONE CHEVRON MIST ELIMINATORS/TRAIN, AN IN-LINE HOT WATER REHEATER, AND A 650 FOOT CORTEN LINED STACK. THE SLUDGE IS FORCIBLY OXIDIZED AND DISPOSED IN A CLAY LINED SETTLING POND. THE WATER LOOP IS OPEN.
NORTHERN STATES POWER SHERBURNE 3 NEW 860 MW (GROSS) 810 MW (ESC) COAL 1.00 %S SUBBITUMINOUS LIME VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/85	NORTHERN STATES POWER HAS PLANS TO CONSTRUCT A 800 MW (NET) PULVERIZED COA (1.0%S, 8700 BTU/LB) FIRED BOILER, SHERBURNE 3, TO BE LOCATED NEXT TO THE SHERBURNE 1 AND 2 UNITS IN BECKER, MINNESOTA. THE UTILITY IS CONSIDERING THE USE OF A LIME SPRAY DRYING PROCESS ALONG WITH FABRIC FILTERS TO CONTROL EMISSIONS. THE SYSTEM IS SCHEDULED TO COMMENCE OPERATIONS IN 1985.
PACIFIC GAS & ELECTRIC MONTEZUMA 1 NEW 800 MW (GROSS) 800 MW (ESC) COAL .80 %S SUBBITUMINOUS LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: 3.5% STATUS 6 STARTUP 6/93	MONTEZUMA 1 OF PACIFIC GAS AND ELECTRIC IS A COAL (0.8% S, 12,000 BTU/LB) FIRED BOILER PLANNED FOR COLLINSVILLE, CALIFORNIA. THE EMISSION CONTROL SYSTEM WILL CONSIST OF A BAGHOUSE AND A LIMESTONE FGD SYSTEM. SLUDGE WILL BE DISPOSED OF IN A LANDFILL. START-UP IS SCHEDULED FOR 1993.
PACIFIC GAS & ELECTRIC MONTEZUMA 2 NEW 800 MW (GROSS) 800 MW (ESC) COAL .80 %S SUBBITUMINOUS LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: 3.5% STATUS 6 STARTUP 6/94	MONTEZUMA 2 OF PACIFIC GAS AND ELECTRIC IS A COAL (0.8% S, 12,000 BTU/LB) FIRED BOILER PLANNED FOR COLLINSVILLE, CALIFORNIA. THE EMISSION CONTROL SYSTEM WILL CONSIST OF A BAGHOUSE AND A LIMESTONE FGD SYSTEM. SLUDGE WILL BE DISPOSED OF IN A LANDFILL. START-UP IS SCHEDULED FOR 1994.
PACIFIC POWER & LIGHT JIM BRIDGER 1 RETROFIT 550 MW (GROSS) 550 MW (ESC) COAL .56 %S SUBBITUMINOUS SODIUM CARBONATE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/88	PACIFIC POWER AND LIGHT'S JIM BRIDGER 1 IS A DRY BOTTOM PULVERIZED SUBBITUMINOUS COAL (0.56%S, 9300 BTU/LB.) FIRED BOILER LOCATED IN ROCK SPRINGS, WYOMING. THE UTILITY IS CURRENTLY INVESTIGATING A RETROFIT FGD SYSTEM FOR SO2 CONTROL. A WET, SODIUM CARBONATE SYSTEM, WHICH TREATS 2,700,000 ACFM OF FLUE GAS, IS BEING PLANNED. A COLD-SIDE ESP IS CURRENTLY IN OPERATION FOR PRIMARY PARTICULATE CONTROL. START-UP IS SCHEDULED FOR 1988.

UNIT IDENTIFICATION	ABSTRACT
PACIFIC POWER & LIGHT JIM BRIDGER 2 RETROFIT 550 MW (GROSS) 550 MW (ESC) COAL .56 %S SUBBITUMINOUS SODIUM CARBONATE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/90	PACIFIC POWER AND LIGHT'S JIM BRIDGER 2 IS A DRY BOTTOM PULVERIZED SUB-BITUMINOUS COAL (0.56%S, 9300 BTU/LB.) FIRED BOILER LOCATED IN ROCK SPRINGS, WYOMING. THE UTILITY IS CURRENTLY INVESTIGATING A RETROFIT FGD SYSTEM FOR SO2 CONTROL. A WET, SODIUM CARBONATE SYSTEM, WHICH TREATS 2,700,000 ACFM OF FLUE GAS, IS BEING PLANNED. A COLD-SIDE ESP IS CURRENTLY IN OPERATION FOR PRIMARY PARTICULATE CONTROL. START-UP IS SCHEDULED FOR 1990.
PACIFIC POWER & LIGHT JIM BRIDGER 2A RETROFIT 550 MW (GROSS) 100 MW (ESC) COAL .56 %S SUBBITUMINOUS LIME/SODIUM CARBONATE FLAKT ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 1/82	PACIFIC POWER AND LIGHT'S JIM BRIDGER 2 IS A DRY BOTTOM PULVERIZED SUB-BITUMINOUS COAL (0.56%S, 9300 BTU/LB) FIRED BOILER LOCATED IN ROCK SPRINGS, WYOMING. THE UTILITY IS CURRENTLY CONSTRUCTING A DEMONSTRATION LIME (ALSO SODIUM CARBONATE)/SPRAY DRYING FGD SYSTEM CAPABLE OF TREATING ONE SIXTH OF THE TOTAL FLUE GAS FLOW FROM THE BOILER. A SLIP STREAM OF APPROXIMATELY 400000 ACFM AT 250F FROM DOWNSTREAM OF THE AIR PREHEATER WILL BE TREATED. OUTLET GAS FROM THE SPRAY DRYER WILL THEN BE DUCTED BACK PRIOR TO THE PRESENT COLD SIDE ESP. THE SYSTEM IS SUPPLIED BY FLAKT AND A/E IS A JOINT VENTURE BETWEEN FLAKT AND PACIFIC POWER & LIGHT. STARTUP IS SCHEDULED FOR JANUARY 1982.
PACIFIC POWER & LIGHT JIM BRIDGER 3 RETROFIT 550 MW (GROSS) 550 MW (ESC) COAL .56 %S SUBBITUMINOUS SODIUM CARBONATE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/86	PACIFIC POWER AND LIGHT'S JIM BRIDGER 3 IS A DRY BOTTOM PULVERIZED SUB-BITUMINOUS COAL (0.56%S, 9300 BTU/LB.) FIRED BOILER LOCATED IN ROCK SPRINGS, WYOMING. THE UTILITY IS CURRENTLY INVESTIGATING A RETROFIT FGD SYSTEM FOR SO2 CONTROL. A WET, SODIUM CARBONATE SYSTEM, WHICH TREATS 2,700,000 ACFM OF FLUE GAS, IS BEING PLANNED. A COLD-SIDE ESP IS CURRENTLY IN OPERATION FOR PRIMARY PARTICULATE CONTROL. START-UP IS SCHEDULED FOR 1986.
PACIFIC POWER & LIGHT JIM BRIDGER 4 NEW 550 MW (GROSS) 550 MW (ESC) COAL .56 %S SUBBITUMINOUS SODIUM CARBONATE AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: .2% STATUS 1 STARTUP 9/79	PACIFIC POWER AND LIGHT'S JIM BRIDGER 4 IS A DRY BOTTOM PULVERIZED SUBBITUMINOUS COAL (0.56% S, 9300 BTU/LB) FIRED BOILER LOCATED IN ROCK SPRINGS, WYOMING. A 91% EFFICIENT SODIUM CARBONATE FGD SYSTEM FOR THIS UNIT WAS SUPPLIED BY THE AIR CORRECTION DIVISION OF UOP. A COLD SIDE ESP TREATS 2,720,000 ACFM OF FLUE GAS, FOLLOWED BY THREE SIEVE TRAY ABSORBERS. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE. A SYSTEM CHECK OUT WAS CONDUCTED IN JULY 1979, AND OPERATIONS BEGAN IN SEPTEMBER 1979.
PENNSYLVANIA POWER BRUCE MANSFIELD 1 NEW 917 MW (GROSS) 917 MW (ESC) COAL 3.00 %S BITUMINOUS LIME GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: 6.0% STATUS 1 STARTUP 12/75	BRUCE MANSFIELD 1 OF PENNSYLVANIA POWER IS A SUPERCRITICAL, BALANCED DRAFT BOILER FIRING PULVERIZED COAL (3.0% S, 11,500 BTU/LB) IN SHIPPINGPORT, PENNSYLVANIA. A GEESI THIOSORBIC LIME FGD SYSTEM WAS DESIGNED TO REMOVE FLYASH AND SO2 (92.1%) FROM 3,350,000 ACFM OF FLUE GAS. THE FGD SYSTEM CONSISTS OF SIX VARIABLE THROAT VENTURI SCRUBBERS FOLLOWED BY SIX FIXED THROAT VENTURI ABSORBERS, HORIZONTAL MIST ELIMINATORS, TWO DIRECT COMBUSTION REHEATERS (INCLUDED IN ORIGINAL DESIGN BUT LATER REMOVED FROM SERVICE AND A 950 FOOT FLAKEGLASS STACK SHARED BY UNITS 1 AND 2. THE WATER LOOP IS OPEN, AND THE CALCILOX STABILIZED SLUDGE IS DISPOSED IN AN OFF-SITE POND. THIS SYSTEM HAS BEEN OPERATIONAL SINCE DECEMBER 1975.
PENNSYLVANIA POWER BRUCE MANSFIELD 2 NEW 917 MW (GROSS) 917 MW (ESC) COAL 3.00 %S BITUMINOUS LIME GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: 6.0% STATUS 1 STARTUP 7/77	BRUCE MANSFIELD 2 OF PENNSYLVANIA POWER IS A SUPERCRITICAL, BALANCED DRAFT BOILER FIRING PULVERIZED COAL (3.0% S, 11,500 BTU/LB) IN SHIPPINGPORT, PENNSYLVANIA. A GEESI THIOSORBIC LIME FGD SYSTEM WAS DESIGNED TO REMOVE FLYASH AND SO2 (92.1%) FROM 3,350,000 ACFM OF FLUE GAS. THE FGD SYSTEM CONSISTS OF SIX VARIABLE THROAT VENTURI SCRUBBERS FOLLOWED BY SIX FIXED THROAT VENTURI ABSORBERS, HORIZONTAL MIST ELIMINATORS, TWO DIRECT COMBUSTION REHEATERS (INCLUDED IN ORIGINAL DESIGN BUT LATER REMOVED FROM SERVICE AND A 950 FOOT FLAKEGLASS STACK SHARED BY UNITS 1 AND 2. THE WATER LOOP IS OPEN, AND THE CALCILOX STABILIZED SLUDGE IS DISPOSED IN AN OFF-SITE POND. THIS SYSTEM HAS BEEN OPERATIONAL SINCE JULY 1977.

UNIT IDENTIFICATION	ABSTRACT
PENNSYLVANIA POWER BRUCE MANSFIELD 3 NEW 917 MW (GROSS) 917 MW (ESC) COAL 3.00 %S LIME PULLMAN KELLOGG ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 6/80	BRUCE MANSFIELD 3 OF PENNSYLVANIA POWER IS A SUPERCRITICAL PULVERIZED COAL (3.0% S, 11,500 BTU/LB) FIRED BOILER LOCATED IN SHIPPINGPORT, PENNSYLVANIA. FOUR ESP'S TREAT 3,308,000 ACFM OF FLUE GAS, FOLLOWED BY FIVE (ONE SPARE) PULLMAN KELLOGG THIOSORBIC LIME ABSORBERS WHICH REMOVE 92.2% OF THE SO2. THE CLEANED GAS PASSES THROUGH CHEVRON MIST ELIMINATORS AND DIRECT COMBUSTION REHEATERS BEFORE DISCHARGE THROUGH A 600 FOOT INCONEL 625 LINED STACK. THE FLYASH STABILIZED SLUDGE IS PIPED TO AN OFF-SITE LANDFILL. OPERATIONS COMMENCED IN JUNE, 1980.
PHILADELPHIA ELECTRIC CROMBY 1 RETROFIT 150 MW (GROSS) 150 MW (ESC) COAL 3.00 %S MAGNESIUM OXIDE UNITED ENGINEERS ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 5/83	PHILADELPHIA ELECTRIC HAS PLANS FOR THE RETROFIT OF AN FGD SYSTEM ON ONE OF THE TWO 3.0% SULFUR COAL FIRED BOILERS AT CROMBY STATION IN PHOENIXVILLE, PENNSYLVANIA. CONSTRUCTION OF THE MAGNESIUM OXIDE SYSTEM SUPPLIED BY UNITED ENGINEERS HAS COMMENCED. THE START-UP DATE IS SET FOR 1983.
PHILADELPHIA ELECTRIC EDDYSTONE 1 RETROFIT 240 MW (GROSS) 240 MW (ESC) COAL 2.60 %S MAGNESIUM OXIDE UNITED ENGINEERS ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 12/82	UNIT 1 OF PHILADELPHIA ELECTRIC'S EDDYSTONE, PENNSYLVANIA STATION IS A BITUMINOUS COAL (2.6% S, 13,600 BTU/LB) FIRED UNIT WHICH USES ESP'S, MECHANICAL COLLECTORS, AND THREE PARTICLE SCRUBBERS (TWO ROD DECK SPRAY TOWERS AND ONE VENTURI) FOR PRIMARY PARTICLE CONTROL. THE UNIT 1 FGD SYSTEM WILL FOLLOW THE TWO ROD DECK SPRAY TOWERS. UNITED ENGINEERS IS SUPPLYING A MAGNESIUM OXIDE FGD SYSTEM FOR SO2 EMISSION CONTROL SIMILAR TO THE MAGNESIUM OXIDE PROTOTYPE SYSTEM THAT WAS PREVIOUSLY OPERATED AT THIS UNIT. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1982.
PHILADELPHIA ELECTRIC EDDYSTONE 2 RETROFIT 334 MW (GROSS) 334 MW (ESC) COAL 2.50 %S MAGNESIUM OXIDE UNITED ENGINEERS ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 12/82	EDDYSTONE 2 OF PHILADELPHIA ELECTRIC IS A 2.5% SULFUR COAL FIRED BOILER LOCATED IN EDDYSTONE, PENNSYLVANIA. THE PLANT'S GENERATING CAPACITY IS 334 MW. UNITED ENGINEERS WILL SUPPLY A MAGNESIUM OXIDE FGD SYSTEM FOR EMISSION CONTROL. START-UP IS SET FOR DECEMBER 1982.
PLAINS ELECTRIC G & T PLAINS ESCALANTE 1 NEW 233 MW (GROSS) 233 MW (ESC) COAL .80 %S SUBBITUMINOUS LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 12/83	PLAINS ESCALANTE 1 IS A PULVERIZED SUBBITUMINOUS COAL FIRED UNIT PLANNED BY PLAINS ELECTRIC G & T COOPERATIVE TO BE LOCATED IN PREWITT, NEW MEXICO. THE 233 MW UNIT WILL UTILIZE A WET LIMESTONE SCRUBBING PROCESS FOR SO2 REMOVAL AND A FABRIC FILTER FOR PRIMARY PARTICLE CONTROL. A CONTRACT HAS BEEN AWARDED TO COMBUSTION ENGINEERING FOR THE WET LIMESTONE SYSTEM. THE UNIT INITIAL START-UP IS PROJECTED FOR DECEMBER 1983.
PLATTE RIVER POWER AUTHORITY RAWHIDE 1 NEW 279 MW (GROSS) 279 MW (ESC) COAL .25 %S BITUMINOUS LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 12/83	THE PLATTE RIVER POWER AUTHORITY HAS PLANS TO CONSTRUCT RAWHIDE 1, IN FT. COLLINS, COLORADO. THE 279 MW PULVERIZED COAL (0.25% S, 8702 BTU/LB) FIRED BOILER WILL BE SUPPLIED BY COMBUSTION ENGINEERING. A CONTRACT HAS BEEN AWARDED TO JOY MANUFACTURING/NIRO ATOMIZER FOR A DRY LIME SCRUBBING SYSTEM FOR EMISSION CONTROL. SLUDGE WILL BE DISPOSED OF IN A LANDFILL. THE UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN DECEMBER 1983.

UNIT IDENTIFICATION	ABSTRACT
PUBLIC SERVICE INDIANA GIBSON 5 NEW 650 MW (GROSS) 650 MW (ESC) COAL 3.30 %S LIMESTONE PULLMAN KELLOGG ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 8/82	GIBSON 5 OF PUBLIC SERVICE OF INDIANA IS A 3.3% SULFUR COAL FIRED UNIT UNDER CONSTRUCTION IN PRINCETON, INDIANA. A CONTRACT WAS AWARDED TO PULLMAN KELLOGG FOR A LIMESTONE FGD SYSTEM CONSISTING OF FOUR KELLOGG-WEIR ABSORBER-REACTOR MODULES. SYSTEM START UP IS EXPECTED IN 1982. THE SYSTEM WILL USE KELLOGG'S PROPRIETARY MAGNESIUM-PROMOTED LIMESTONE.
PUBLIC SERVICE OF NEW MEXICO SAN JUAN 1 RETROFIT 361 MW (GROSS) 361 MW (ESC) COAL .80 %S SUBBITUMINOUS WELLMAN LORD DAVY MCKEE ENERGY CONSUMPTION: 4.4% STATUS 1 STARTUP 4/78	SAN JUAN 1 OF PUBLIC SERVICE OF NEW MEXICO IN WATERFLOW, NEW MEXICO IS A COAL (0.8% S, 8100 BTU/LB) FIRED BOILER WHICH SUPPLIES 1,319,000 ACFM OF FLUE GAS TO A RETROFIT WELLMAN LORD FGD SYSTEM BY DAVY POWERGAS. THE EMISSION CONTROL SYSTEM, OPERATIONAL SINCE APRIL 1978, CONSISTS OF A HOT SIDE ESP FOLLOWED BY FOUR (ONE SPARE) VENTURI SCRUBBER/SPRAY TOWER ABSORBER TRAINS WHICH WERE DESIGNED TO REMOVE 85% OF THE FLUE GAS SO2. AN INDIRECT HOT AIR REHEATER PRECEDES A BRICK LINED STACK. END PRODUCT ELEMENTAL SULFUR IS PRODUCED BY THE ALLIED CHEMICAL PROCESS. THE WATER LOOP IS CLOSED.
PUBLIC SERVICE OF NEW MEXICO SAN JUAN 2 RETROFIT 350 MW (GROSS) 350 MW (ESC) COAL .80 %S SUBBITUMINOUS WELLMAN LORD DAVY MCKEE ENERGY CONSUMPTION: 4.6% STATUS 1 STARTUP 8/78	SAN JUAN 2 OF PUBLIC SERVICE OF NEW MEXICO IN WATERFLOW, NEW MEXICO IS A COAL (0.8% S, 8100 BTU/LB) FIRED BOILER WHICH SUPPLIES 1,319,000 ACFM OF FLUE GAS TO A RETROFIT WELLMAN LORD FGD SYSTEM BY DAVY POWERGAS. THE EMISSION CONTROL SYSTEM, OPERATIONAL SINCE AUGUST 1978, CONSISTS OF A HOT SIDE ESP FOLLOWED BY FOUR (ONE SPARE) VENTURI SCRUBBER/SPRAY TOWER ABSORBER TRAINS WHICH WERE DESIGNED TO REMOVE 85% OF THE FLUE GAS SO2. AN INDIRECT HOT AIR REHEATER PRECEDES A BRICK LINED STACK. END PRODUCT ELEMENTAL SULFUR IS PRODUCED BY THE ALLIED CHEMICAL PROCESS. THE WATER LOOP IS CLOSED.
PUBLIC SERVICE OF NEW MEXICO SAN JUAN 3 NEW 534 MW (GROSS) 534 MW (ESC) COAL .80 %S SUBBITUMINOUS WELLMAN LORD DAVY MCKEE ENERGY CONSUMPTION: 3.6% STATUS 1 STARTUP 12/79	SAN JUAN 3 IS A COAL (0.8% S, 8100 BTU/LB) FIRED UNIT OF THE PUBLIC SERVICE OF NEW MEXICO AND IS LOCATED IN WATERFLOW, NEW MEXICO. THE FGD SYSTEM, SUPPLIED BY DAVY POWERGAS, UTILIZES THE WELLMAN LORD SO2 RECOVERY RECOVERY PROCESS AND SULFURIC ACID IS PRODUCED AS THE END PRODUCT. FIVE (ONE SPARE) VENTURI SCRUBBER/SPRAY TOWER ABSORBER (90% DESIGN SO2 REMOVAL) TRAINS FOLLOW A HOT SIDE ESP. AN INDIRECT HOT AIR REHEATER BOOSTS THE GAS TEMPERATURE 50 DEG F. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE. OPERATIONS COMMENCED IN DECEMBER 1979.
PUBLIC SERVICE OF NEW MEXICO SAN JUAN 4 NEW 534 MW (GROSS) 534 MW (ESC) COAL .80 %S SUBBITUMINOUS WELLMAN LORD DAVY MCKEE ENERGY CONSUMPTION: 3.6% STATUS 2 STARTUP 6/82	SAN JUAN 4 IS A COAL (0.8% S, 8100 BTU/LB) FIRED UNIT OF THE PUBLIC SERVICE OF NEW MEXICO UNDER CONSTRUCTION IN WATERFLOW, NEW MEXICO. THE FGD SYSTEM, BEING SUPPLIED BY DAVY POWERGAS, WILL UTILIZE THE WELLMAN LORD SO2 RECOVERY PROCESS AND SULFURIC ACID WILL BE PRODUCED AS THE END PRODUCT. FIVE (ONE SPARE) VENTURI SCRUBBER/SPRAY TOWER ABSORBER (90% DESIGN SO2 REMOVAL) TRAINS WILL FOLLOW A HOT SIDE ESP. AN INDIRECT HOT AIR REHEATER WILL BOOST THE GAS TEMPERATURE 50 DEG F. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP MODE. START-UP IS EXPECTED IN JUNE 1982.
PWR AUTHORITY OF STATE OF NY FOSSIL NEW 700 MW (GROSS) 700 MW (ESC) COAL 3.00 %S PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 4/87	THE POWER AUTHORITY OF NEW YORK PLANS A NEW 3.0% SULFUR COAL FIRED UNIT WHICH WILL BE LOCATED AT THE ARTHUR KILL FACILITY ON STATEN ISLAND. THE UTILITY IS PRESENTLY CONSIDERING FGD SYSTEMS FOR THIS UNIT. PUBLIC SERVICE COMMISSION HEARINGS ARE CURRENTLY IN PROGRESS. START-UP IS EXPECTED IN APRIL 1987.

UNIT IDENTIFICATION	ABSTRACT
SALT RIVER PROJECT CORONADO 1 NEW 350 MW (GROSS) 280 MW (ESC) COAL .50 %S SUBBITUMINOUS LIMESTONE PULLMAN KELLOGG ENERGY CONSUMPTION: 4.3% STATUS 1 STARTUP 11/79	SALT RIVER PROJECT'S CORONADO 1 IS A DRY BOTTOM PULVERIZED SUBBITUMINOUS COAL (0.5% S, 12,000 BTU/LB) FIRED BOILER LOCATED IN ST. JOHNS, ARIZONA. PULLMAN KELLOGG SUPPLIED THE TWO LIMESTONE HORIZONTAL WEIR SPRAY TOWERS WHICH REMOVES 82.5% OF THE SO2 FROM THE FLUE GAS PASSED THROUGH THEM. VERTICAL HEIL MIST ELIMINATORS PRECEDE A 500 FOOT STACK. A MINIMUM OF 20% BYPASS PROVIDES REHEAT. THE WATER LOOP IS AN OPEN MODE, AND THE UNSTABILIZED SLUDGE IS DISPOSED IN AN UNLINED POND. START-UP WAS IN NOVEMBER 1979.
SALT RIVER PROJECT CORONADO 2 NEW 350 MW (GROSS) 280 MW (ESC) COAL .50 %S SUBBITUMINOUS LIMESTONE PULLMAN KELLOGG ENERGY CONSUMPTION: 4.3% STATUS 1 STARTUP 7/80	SALT RIVER PROJECT'S CORONADO 2 IS A DRY BOTTOM PULVERIZED SUBBITUMINOUS COAL (0.5% S, 12,000 BTU/LB) FIRED BOILER LOCATED IN ST. JOHNS, ARIZONA. PULLMAN KELLOGG SUPPLIED TWO LIMESTONE HORIZONTAL WEIR SPRAY TOWERS WHICH REMOVES 82.5% OF THE SO2 FROM THE FLUE GAS PASSED THROUGH THEM. VERTICAL HEIL MIST ELIMINATORS PRECEDE A 500 FOOT STACK. A MINIMUM OF 20% BYPASS PROVIDES REHEAT. THE WATER LOOP IS AN OPEN MODE, AND THE UNSTABILIZED SLUDGE IS DISPOSED IN AN UNLINED POND. START-UP WAS IN JULY 1980.
SALT RIVER PROJECT CORONADO 3 NEW 400 MW (GROSS) 280 MW (ESC) COAL .60 %S SUBBITUMINOUS LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: 3.8% STATUS 6 STARTUP 0/89	CORONADO 3 IS A DRY BOTTOM PULVERIZED SUBBITUMINOUS COAL (.60% S, 8300 BTU/LB) FIRED UNIT PLANNED BY SALT RIVER PROJECT TO BE LOCATED IN ST. JOHN'S, ARIZONA. THE UTILITY IS PRESENTLY CONSIDERING THE INSTALLATION OF TWO HORIZONTAL SPRAY TOWERS UTILIZING LIMESTONE AS THE ABSORBENT. PLANS FOR AN EMISSION CONTROL SYSTEM HAVE NOT BEEN FINALIZED. THE SYSTEM WILL HAVE A 20% BYPASS REHEAT, AND THE SLUDGE WILL PROBABLY BE PONDED. SCHEDULED OPERATION DATE IS 1989.
SAN MIGUEL ELECTRIC SAN MIGUEL 1 NEW 400 MW (GROSS) 400 MW (ESC) COAL 1.70 %S LIGNITE LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: 5.0% STATUS 1 STARTUP 8/81	SAN MIGUEL 1 OF THE SAN MIGUEL ELECTRIC COOP IS A LIGNITE (1.7% S, 5000 BTU/LB) FIRED RADIANT BOILER LOCATED IN SAN MIGUEL, TEXAS. THE EMISSION CONTROL SYSTEM ON THIS UNIT CONSISTS OF A COLD SIDE ESP FOLLOWED BY FOUR BABCOCK AND WILCOX 86% EFFICIENT LIMESTONE TCA MODULES. CHEVRON MIST ELIMINATORS PRECEDE AN IN-LINE REHEATER AND AN ACID BRICK LINED STACK. THE WATER LOOP IS CLOSED, AND THE DEWATERED SLURRY IS MIXED WITH FLYASH BY RESEARCH COTTRELL AND DISPOSED OF IN AN OFF SITE LANDFILL. OPERATIONS COMMENCED IN AUGUST 1981.
SEMINOLE ELECTRIC SEMINOLE 1 NEW 620 MW (GROSS) 620 MW (ESC) COAL 2.75 %S SUBBITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 3/83	SEMINOLE 1 OF SEMINOLE ELECTRIC IS A COAL (2.75% S, 11,700 BTU/LB) FIRED UNIT PLANNED FOR LOCATION IN PALATKA, FLORIDA. THE EMISSION CONTROL SYSTEM WILL CONSIST OF ESP'S AND A LIMESTONE FGD SYSTEM. THE FGD SYSTEM WILL BE SUPPLIED BY PEABODY PROCESS SYSTEMS. START-UP IS EXPECTED IN MARCH 1983.
SEMINOLE ELECTRIC SEMINOLE 2 NEW 620 MW (GROSS) 620 MW (ESC) COAL 2.75 %S SUBBITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 1/85	SEMINOLE 2 OF SEMINOLE ELECTRIC IS A COAL (2.75% S, 11,700 BTU/LB) FIRED UNIT PLANNED FOR LOCATION IN PALATKA, FLORIDA. THE EMISSION CONTROL SYSTEM WILL CONSIST OF ESP'S AND A LIMESTONE FGD SYSTEM. THE FGD SYSTEM WILL BE SUPPLIED BY PEABODY SYSTEMS. START-UP IS EXPECTED IN JANUARY 1985.

UNIT IDENTIFICATION	ABSTRACT
SIERRA PACIFIC POWER VALMY 2 NEW 276 MW (GROSS) 276 MW (ESC) COAL ***** %S LIME/SPRAY DRYING VENDOR NOT SELECTED ENERGY CONSUMPTION: ** *% STATUS 7 STARTUP 8/84	SIERRA PACIFIC POWER HAS PLANS TO CONSTRUCT A 276 MW UNIT TO BE LOCATED IN VALMY, NEVADA. THE FOSTER WHEELER PULVERIZED COAL FIRED BOILER AT THE VALMY 2 STATION WILL UTILIZE AN FGD SYSTEM OR FIRE LOW SULFUR COAL TO CONTROL SO2 EMISSIONS. IF FGD IS SELECTED, A DRY LIME SYSTEM WILL BE UTILIZED. THE UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN AUGUST 1984.
SIKESTON BRD OF MUNICIPAL UTIL SIKESTON 1 NEW 235 MW (GROSS) 235 MW (ESC) COAL 2.80 %S BITUMINOUS LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: 1.7% STATUS 1 STARTUP 6/81	THE SIKESTON BOARD OF MUNICIPAL UTILITIES' SIKESTON 1 IS A PULVERIZED COAL (2.8% S, 11,340 BTU/LB) FIRED BOILER LOCATED IN SIKESTON, MISSOURI. BABCOCK AND WILCOX SUPPLIED THE EMISSION CONTROL SYSTEM CONSISTING OF TWO ESP'S AND THREE 50% CAPACITY LIMESTONE VENTURI FGD MODULES. THE CLEANED GAS PASSES THROUGH CHEVRON MIST ELIMINATORS BEFORE EXITING A 450 FOOT FRP LINED FLUE (A SECOND CARBON STEEL LINED FLUE, USED FOR EMERGENCY BYPASS, IS ALSO IN THE STACK). THE WATER LOOP MODE IS OPEN, AND THE SLUDGE IS PONDED. THE SYSTEM STARTED OPERATIONS IN JUNE 1981.
SOUTH CAROLINA PUBLIC SERVICE CROSS 1 NEW 500 MW (GROSS) 500 MW (ESC) COAL 1.80 %S BITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 5/88	SOUTH CAROLINA PUBLIC SERVICE HAS PLANS TO CONSTRUCT TWO NEW UNITS, CROSS 1 AND 2, TO BE LOCATED IN CROSS, SOUTH CAROLINA. EACH 500 MW BOILER WILL FIRE COAL WITH A SULFUR CONTENT RANGING BETWEEN 1.0 AND 2.3%. THE UTILITY HAS SIGNED A CONTRACT WITH PEABODY PROCESS SYSTEMS FOR THE INSTALLATION OF A WET LIMESTONE SCRUBBING SYSTEM TO CONTROL SO2 EMISSIONS. UNIT 1 IS SCHEDULED TO COMMENCE OPERATIONS IN MAY 1988.
SOUTH CAROLINA PUBLIC SERVICE CROSS 2 NEW 500 MW (GROSS) 500 MW (ESC) COAL 1.80 %S BITUMINOUS LIMESTONE PEABODY PROCESS SYSTEMS ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 11/83	SOUTH CAROLINA PUBLIC SERVICE HAS PLANS TO CONSTRUCT TWO NEW UNITS, CROSS 1 AND 2, TO BE LOCATED IN CROSS, SOUTH CAROLINA. EACH 500 MW BOILER WILL FIRE COAL WITH A SULFUR CONTENT RANGING BETWEEN 1.0 AND 2.3%. CONSTRUCTION OF THE WET LIMESTONE SCRUBBING SYSTEM BEING SUPPLIED BY PEABODY PROCESS SYSTEMS FOR SO2 CONTROL HAS COMMENCED. UNIT 2 IS SCHEDULED TO COMMENCE OPERATIONS IN NOVEMBER 1983.
SOUTH CAROLINA PUBLIC SERVICE WINYAH 2 NEW 280 MW (GROSS) 140 MW (ESC) COAL 1.10 %S BITUMINOUS LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: 1.1% STATUS 1 STARTUP 7/77	WINYAH 2 OF SOUTH CAROLINA PUBLIC SERVICE IS A PULVERIZED BITUMINOUS COAL (1.70% S, 11,500 BTU/LB) FIRED UNIT LOCATED IN GEORGETOWN, SOUTH CAROLINA. A COLD SIDE ESP AND A BABCOCK AND WILCOX VENTURI SCRUBBER/LIMESTONE TRAY TOWER ABSORBER TRAIN DESIGNED TO REMOVE 45% OF THE SO2 FROM THE BOILER FLUE GAS MAKE UP THE EMISSION CONTROL SYSTEM ON THIS UNIT. THE SYSTEM OPERATES IN AN OPEN WATER LOOP, AND THE SLUDGE IS DISPOSED IN AN ON-SITE UNLINED POND. THIS SYSTEM HAS BEEN OPERATIONAL SINCE JULY 1977.
SOUTH CAROLINA PUBLIC SERVICE WINYAH 3 NEW 280 MW (GROSS) 280 MW (ESC) COAL 1.10 %S LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: 2.1% STATUS 1 STARTUP 5/80	WINYAH 3 OF SOUTH CAROLINA PUBLIC SERVICE IS A DRY BOTTOM BOILER WHICH FIRES 1.7% SULFUR COAL (11,500 BTU/LB) AND IS LOCATED IN GEORGETOWN, SOUTH CAROLINA. AN ESP PRECEDES A BABCOCK AND WILCOX LIMESTONE FGD SYSTEM AND AN INDIRECT STEAM REHEATER. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE. OPERATIONS COMMENCED IN MAY 1980.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
SOUTH CAROLINA PUBLIC SERVICE WINYAH 4 NEW 280 MW (GROSS) 280 MW (ESC) COAL 1.70 %S BITUMINOUS LIMESTONE AMERICAN AIR FILTER ENERGY CONSUMPTION: 2.1% STATUS 1 STARTUP 7/81	SOUTH CAROLINA PUBLIC SERVICE'S WINYAH 4 IS A BITUMINOUS COAL (1.70% S, 11,500 BTU/LB) FIRED UNIT LOCATED IN GEORGETOWN, SOUTH CAROLINA. TWO AMERICAN AIR FILTER LIMESTONE SLURRY SPRAY TOWERS FOLLOW AN ESP. THE TEMPERATURE OF THE CLEANED GAS IS RAISED BY AN INDIRECT STEAM REHEATER. THE SYSTEM OPERATES IN A CLOSED WATER LOOP MODE. INITIAL OPERATIONS COMMENCED IN JULY 1981.
SOUTH MISSISSIPPI ELEC PWR R.D. MORROW, SR. 1 NEW 200 MW (GROSS) 124 MW (ESC) COAL 1.30 %S BITUMINOUS LIMESTONE ENVIRONEERING, RILEY STOKER ENERGY CONSUMPTION: 5.5% STATUS 1 STARTUP 8/78	R.D. MORROW 1 OF SOUTHERN MISSISSIPPI ELECTRIC IS A PULVERIZED COAL (1.3% S, 12,000 BTU/LB) FIRED UNIT IN HATTISBURG, MISSISSIPPI. THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A HOT SIDE ESP FOLLOWED BY A LIMESTONE VENTRI-ROD ABSORBER SUPPLIED BY RILEY STOKER/ENVIRONEERING. AFTER THE CLEANED GAS PASSES THROUGH A VERTICAL CHEVRON MIST ELIMINATOR, IT IS JOINED BY A 38% BYPASS REHEAT BEFORE IT IS DISCHARGED THROUGH A 408 FOOT STACK SHARED BY UNITS 1 AND 2 (EACH UNIT HAS ITS OWN ACID BRICK LINED FLUE). THE WATER LOOP IS CLOSED, AND THE FLYASH STABILIZED SLUDGE IS HAULED BY TRUCK TO AN OFF SITE LANDFILL. THE SYSTEM HAS BEEN OPERATIONAL SINCE AUGUST 1978.
SOUTH MISSISSIPPI ELEC PWR R.D. MORROW, SR. 2 NEW 200 MW (GROSS) 124 MW (ESC) COAL 1.30 %S BITUMINOUS LIMESTONE ENVIRONEERING, RILEY STOKER ENERGY CONSUMPTION: 5.5% STATUS 1 STARTUP 6/79	R.D. MORROW 2 OF SOUTHERN MISSISSIPPI ELECTRIC IS A PULVERIZED COAL (1.3% S, 12,000 BTU/LB) FIRED UNIT IN HATTISBURG, MISSISSIPPI. THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A HOT SIDE ESP FOLLOWED BY A LIMESTONE VENTRI-ROD ABSORBER SUPPLIED BY RILEY STOKER/ENVIRONEERING. AFTER THE CLEANED GAS PASSES THROUGH A VERTICAL CHEVRON MIST ELIMINATOR, IT IS JOINED BY A 38% BYPASS REHEAT BEFORE IT IS DISCHARGED THROUGH A 408 FOOT STACK SHARED BY UNITS 1 AND 2 (EACH UNIT HAS ITS OWN ACID BRICK LINED FLUE). THE WATER LOOP IS CLOSED, AND THE FLYASH STABILIZED SLUDGE IS HAULED BY TRUCK TO AN OFF SITE LANDFILL. THE SYSTEM HAS BEEN OPERATIONAL SINCE JUNE 1979.
SOUTHERN ILLINOIS POWER MARION 4 NEW 173 MW (GROSS) 173 MW (ESC) COAL/REFUS 3.75 %S BITUMINOUS LIMESTONE BABCOCK & WILCOX ENERGY CONSUMPTION: 2.3% STATUS 1 STARTUP 5/79	UNIT 4 AT SOUTHERN ILLINOIS POWER COOP'S MARION STATION IN MARION, ILLINOIS IS A CYCLONE FIRED COAL (3.5% S, 9000 BTU/LB) BOILER WHICH IS SERVED BY A 89.4% EFFICIENT (DESIGN) LIMESTONE FGD SYSTEM SUPPLIED BY BABCOCK AND WILCOX. TWO SPRAY TOWERS AND A BRICK LINED STACK ARE DOWNSTREAM OF AN ESP IN THIS SYSTEM. THE WATER LOOP IS OPEN, AND THE FLYASH STABILIZED SLUDGE IS DEWATERED AND LANDFILLED. THE SYSTEM BECAME OPERATIONAL DURING MAY 1979.
SOUTHERN INDIANA GAS & ELEC A.B. BROWN 1 NEW 265 MW (GROSS) 265 MW (ESC) COAL 3.35 %S BITUMINOUS DUAL ALKALI FMC ENERGY CONSUMPTION: .8% STATUS 1 STARTUP 3/79	SOUTHERN INDIANA GAS AND ELECTRIC'S A.B.BROWN 1 IS A DRY BOTTOM PULVERIZED COAL (3.35% S, 13,010 BTU/LB) FIRED UNIT IN WEST FRANKLIN, INDIANA. FMC SUPPLIED A DUAL ALKALI FGD SYSTEM DESIGNED TO REMOVE 85% OF THE FLUE GAS SO2. THE UNIT CONSISTS OF TWO THREE STAGE DISC CONTACTORS. A COLD SIDE ESP PROVIDES PRIMARY PARTICULATE CONTROL, AND ONE CHEVRON MIST ELIMINATOR/MODULE PRECEDES A 498 FOOT ACID BRICK LINED STACK. THE SYSTEM PRODUCES A FILTER CAKE WASTE PRODUCT WHICH IS DISPOSED IN AN ON SITE LANDFILL. THE WATER LOOP CAN BE EITHER OPEN OR CLOSED. THE SYSTEM HAS BEEN OPERATIONAL SINCE MARCH 1979.
SOUTHERN INDIANA GAS & ELEC A.B. BROWN 2 265 MW (GROSS) 265 MW (ESC) COAL 3.35 %S BITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: .8% STATUS 5 STARTUP 1/85	SOUTHERN INDIANA GAS AND ELECTRIC HAS PLANS TO CONSTRUCT ANOTHER UNIT, A.B. BROWN 2, TO BE LOCATED IN WEST FRANKLIN, INDIANA. THE 265-MW (GROSS) UNIT WILL FIRE BITUMINOUS COAL WITH AN AVERAGE SULFUR CONTENT OF 3.35%. A COLD SIDE ESP WILL PROVIDE PRIMARY PARTICULATE MATTER CONTROL AND AN FGD SYSTEM WILL BE USED TO CONTROL SO2 EMISSIONS. THE FLUE GAS WILL EXIT THROUGH A 498-FOOT STACK. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP MODE AND THE SLUDGE WILL BE DISPOSED IN AN ON-SITE LANDFILL. OPERATIONS ARE SCHEDULED TO COMMENCE IN JANUARY 1985.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
SOUTHWESTERN ELECTRIC POWER DOLET HILLS 1 NEW 720 MW (GROSS) 720 MW (ESC) COAL .70 %S LIGNITE LIMESTONE AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 3/86	DOLET HILLS 1 OF SOUTHWESTERN ELECTRIC POWER IS A PLANNED 720 MW LIGNITE (0.7%S, 7100 BTU/LB) FIRED BOILER TO BE LOCATED IN MANSFIELD, LOUISIANA. THE EMISSION CONTROL SYSTEM WILL CONSIST OF AN ESP FOR PARTICULATE CONTROL AND A WET LIMESTONE FGD SYSTEM FOR SO2 CONTROL. THE FLUE GAS WILL EXIT THROUGH A 525 FOOT STACK. A CONTRACT HAS BEEN AWARDED TO UOP FOR THE FGD SYSTEM. THE UNIT IS SCHEDULED TO START-UP IN 1986.
SOUTHWESTERN ELECTRIC POWER DOLET HILLS 2 NEW 720 MW (GROSS) 720 MW (ESC) COAL .70 %S LIGNITE LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP [illegible]/88	DOLET HILLS 2 OF SOUTHWESTERN ELECTRIC POWER IS A PLANNED 720 MW LIGNITE (0.7%S, 7100 BTU/LB) FIRED BOILER TO BE LOCATED IN MANSFIELD, LOUISIANA. THE EMISSION CONTROL SYSTEM WILL CONSIST OF AN ESP FOR PARTICULATE CONTROL AND A WET LIMESTONE FGD SYSTEM FOR SO2 CONTROL. THE FLUE GAS WILL EXIT THROUGH A 525 FOOT STACK. THE UNIT IS SCHEDULED TO BEGIN OPERATIONS IN 1988.
SOUTHWESTERN ELECTRIC POWER HENRY W. PIRKEY 1 NEW 720 MW (GROSS) 720 MW (ESC) COAL .80 %S LIGNITE LIMESTONE AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 12/84	HENRY W. PIRKEY 1 IS A WET BOTTOM LIGNITE (0.8% S, 6300 BTU/LB) FIRED UNIT PLANNED BY SOUTHWESTERN ELECTRIC POWER FOR LOCATION IN HALLSVILLE, TEXAS. A CONTRACT HAS BEEN AWARDED TO THE AIR CORRECTION DIVISION OF UOP FOR FOUR LIMESTONE SPRAY TOWERS (99+% EFFICIENCY). MIST ELIMINATION WILL BE PROVIDED BY TWO STAGE CHEVRONS, AND THE STACK WILL BE ACID BRICK LINED. NO REHEAT IS PLANNED. THE WATER LOOP WILL BE CLOSED, AND THE SLUDGE WILL BE POZ-O-TEC STABILIZED. START-UP IS EXPECTED BY DECEMBER 1984.
SOYLAND POWER SOYLAND 1 NEW 500 MW (GROSS) 500 MW (ESC) COAL 3.00 %S UNDECIDED PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 6/87	SOYLAND POWER COOP HAS PLANS FOR A NEW UNIT, SOYLAND 1, TO BE LOCATED IN ILLINOIS. THE COAL FIRED BOILER IS TO BE RATED AT 500 MW (GROSS) AND UTILIZE A FGD SYSTEM TO CONTROL EMISSIONS. OPERATIONS ARE SCHEDULED TO COMMENCE IN 1987.
SPRINGFIELD CITY UTILITIES SOUTHWEST 1 NEW 194 MW (GROSS) 194 MW (ESC) COAL 3.50 %S BITUMINOUS LIMESTONE AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: 4.6% STATUS 1 STARTUP 4/77	SPRINGFIELD CITY UTILITIES' SOUTHWEST 1 IS A PULVERIZED BITUMINOUS COAL (3.5% S, 12,500 BTU/LB) FIRED BOILER LOCATED IN SPRINGFIELD, MISSOURI. THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A COLD SIDE ESP FOLLOWED BY TWO UOP LIMESTONE TCA MODULES WHICH WERE DESIGNED TO REMOVE 80% OF THE FLUE GAS SO2. ONE CHEVRON/MODULE LEADS TO A 384 FOOT CEILCOTE LINED STACK. THE DRY FLYASH STABILIZED SLUDGE IS DEWATERED BY A ROTARY DRUM VACUUM AND TRUCKED TO A LANDFILL. THE SYSTEM HAS BEEN OPERATIONAL SINCE APRIL 1977.
SPRINGFIELD WATER, LIGHT & PWR DALLMAN 3 NEW 205 MW (GROSS) 185 MW (ESC) COAL 3.30 %S BITUMINOUS LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 4.9% STATUS 1 STARTUP 12/80	DALLMAN 3 OF SPRINGFIELD WATER, LIGHT, AND POWER IS A PULVERIZED COAL (3.3% S, 10,500 BTU/LB) FIRED BOILER LOCATED IN SPRINGFIELD, ILLINOIS. RESEARCH COTTRELL SUPPLIED A LIMESTONE FGD SYSTEM DESIGNED TO REMOVE 95% OF THE SO2 FROM 850,000 ACFM OF BOILER FLUE GAS. A HOT SIDE ESP PRECEDES TWO PACKED TOWER ABSORBERS, ONE HORIZONTAL CHEVRON PER MODULE, AND A 500 FOOT ACID BRICK LINED STACK. NO REHEAT IS PROVIDED. SLUDGE IS DISPOSED OF IN A LANDFILL. FGD OPERATIONS COMMENCED IN OCTOBER 1980.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
ST. JOE ZINC G.F. WEATON 1 RETROFIT 60 MW (GROSS) 60 MW (ESC) COAL 2.00 %S BITUMINOUS CITRATE MORRISON & KNUDSEN/U.S.B.M. ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 11/79	G.F. WEATON 1, OWNED BY ST. JOE ZINC, IS A COAL (2.0% S, 12,500 BTU/LB) FIRED BOILER LOCATED IN MONACA, PENNSYLVANIA. THE BUREAU OF MINES RETROFITTED A PROTOTYPE CITRATE FGD SYSTEM ON THIS UNIT, WHICH PROVIDES POWER FOR THE LOCAL UTILITY GRID. ONE VENTURI SCRUBBER/ABSORBER TRAIN FOLLOWS A COLD SIDE ESP. TWO CHEVRON MIST ELIMINATORS ARE FOLLOWED BY A COMBINATION OF INDIRECT HOT AIR AND DIRECT COMBUSTION REHEATERS, AND A 102 FOOT FIBERGLASS LINED SCRUBBER STACK. THE SYSTEM SO2 REMOVAL EFFICIENCY WILL BE OVER 90%. THE WATER LOOP IS CLOSED LOOP MODE. THE FGD SYSTEM COMMENCED OPERATION IN NOVEMBER 1979.
SUNFLOWER ELECTRIC HOLCOMB 1 NEW 347 MW (GROSS) 347 MW (ESC) COAL .47 %S SUBBITUMINOUS LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER ENERGY CONSUMPTION: .9% STATUS 2 STARTUP 9/83	SUNFLOWER ELECTRIC COOP'S HOLCOMB 1 STATION IS A PLANNED 347 MW UNIT TO BE LOCATED IN HOLCOMB, KANSAS. THE PULVERIZED COAL (0.47% S, 8800 BTU/LB) FIRED BABCOCK AND WILCOX BOILER WILL UTILIZE A JOY MANUFACTURING/NIRO ATOMIZER DRY SCRUBBING PROCESS FOR SO2 CONTROL. A FABRIC FILTER WILL BE UTILIZED FOR PRIMARY PARTICLE CONTROL. THE UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN THE FALL OF 1983.
TAMPA ELECTRIC BIG BEND 4 NEW 475 MW (GROSS) 475 MW (ESC) COAL 2.35 %S LIME/LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 2.1% STATUS 3 STARTUP 3/85	UNIT 4 AT TAMPA ELECTRIC'S BIG BEND STATION IS A PLANNED DRY BOTTOM PULVERIZED COAL (2.35% S, 10,300 BTU/LB) FIRED UNIT TO BE LOCATED IN TAMPA, FLORIDA. A CONTRACT HAS BEEN AWARDED TO RESEARCH-COTTRELL FOR A WET LIME/LIMESTONE SCRUBBING PROCESS. AN ESP WILL PROVIDE PRIMARY PARTICULATE CONTROL. THE FGD SYSTEM, WHICH WILL REMOVE 90% OF THE FLUE GAS SO2, WILL INCLUDE AN INDIRECT HOT AIR REHEATER LEADING TO A 490 FOOT CONCRETE LINED STACK. THE UNIT WILL PRODUCE GYPSUM AS A SALEABLE PRODUCT.
TENNESSEE VALLEY AUTHORITY PARADISE 1 RETROFIT 704 MW (GROSS) 704 MW (ESC) COAL 4.20 %S LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 3/82	PARADISE 1 OF TVA IS A 4.2% SULFUR COAL FIRED UNIT LOCATED IN PARADISE, KENTUCKY. A CONTRACT HAS BEEN AWARDED TO GEESI FOR AN 84.2% EFFICIENT LIMESTONE FGD SYSTEM TO BE RETROFITTED ON THIS BOILER. SIX VENTURI SCRUBBERS AND VENTURI ABSORBER TRAINS WILL FOLLOW AN ESP. INLET FLUE GAS WILL BE USED TO HEAT WATER, WHICH IN TURN WILL BE USED TO REHEAT THE OUTLET FLUE GAS. FORCED OXIDATION WILL BE USED IN ONE MODULE TO CONTROL SCALING THROUGHOUT THE SYSTEM. THE UTILITY EXPECTS TO GET AN 80% SOLIDS LANDFILLABLE GRADE SLUDGE. OPERATIONS SHOULD START IN MARCH 1982.
TENNESSEE VALLEY AUTHORITY PARADISE 2 RETROFIT 704 MW (GROSS) 704 MW (ESC) COAL 4.20 %S LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 6/82	PARADISE 2 OF TVA IS A 4.2% SULFUR COAL FIRED UNIT LOCATED IN PARADISE, KENTUCKY. A CONTRACT HAS BEEN AWARDED TO GEESI FOR AN 84.2% EFFICIENT LIMESTONE FGD SYSTEM TO BE RETROFITTED ON THIS BOILER. SIX VENTURI SCRUBBERS AND VENTURI ABSORBER TRAINS WILL FOLLOW AN ESP. INLET FLUE GAS WILL BE USED TO HEAT WATER, WHICH IN TURN WILL BE USED TO REHEAT THE OUTLET FLUE GAS. FORCED OXIDATION WILL BE USED IN ONE MODULE TO CONTROL SCALING THROUGHOUT THE SYSTEM. THE UTILITY EXPECTS TO GET AN 80% SOLIDS LANDFILLABLE GRADE SLUDGE. OPERATIONS SHOULD START IN JUNE 1982.
TENNESSEE VALLEY AUTHORITY SHAWNEE 10A RETROFIT 10 MW (GROSS) 10 MW (ESC) COAL 2.90 %S BITUMINOUS LIME/LIMESTONE AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 4/72	SHAWNEE 10 OF TVA IS A 2.9% SULFUR BITUMINOUS COAL FIRED BOILER LOCATED IN PADUCAH, KENTUCKY. MODULE 10A IS A RETROFIT PROTOTYPE LIME/LIMESTONE TCA SYSTEM SUPPLIED BY THE AIR CORRECTION DIVISION, UOP. THE SYSTEM UTILIZES A CHEVRON MIST ELIMINATOR AND A DIRECT COMBUSTION REHEATER, AND OPERATES IN A CLOSED WATER LOOP. THIS TEST PROGRAM WAS FUNDED BY EPA WITH TVA AS THE CONSTRUCTOR AND FACILITY OPERATOR. THE BECHTEL CORP. OF SAN FRANCISCO WAS THE MAJOR CONTRACTOR, TEST DIRECTOR, AND REPORT WRITER. THE SYSTEM HAS BEEN OPERATIONAL SINCE APRIL 1972.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
TENNESSEE VALLEY AUTHORITY SHAWNEE 10B RETROFIT 10 MW (GROSS) 10 MW (ESC) COAL 2.90 %S BITUMINOUS LIME/LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 4/72	SHAWNEE 10 OF TVA IS A 2.9% SULFUR BITUMINOUS COAL FIRED BOILER LOCATED IN PADUCAH, KENTUCKY. MODULE 10B IS A RETROFIT PROTOTYPE LIME/LIMESTONE VENTURI SCRUBBER/SPRAY TOWER ABSORBER SUPPLIED BY GEESI. THE SYSTEM, OPERATIONAL SINCE APRIL 1972, INCLUDES A CHEVRON MIST ELIMINATOR AND A DIRECT COMBUSTION REHEATER, AND OPERATES IN A CLOSED WATER LOOP. THIS TEST PROGRAM WAS FUNDED BY EPA WITH TVA AS THE CONSTRUCTOR AND FACILITY OPERATOR. THE BECHTEL CORP. OF SAN FRANCISCO WAS THE MAJOR CONTRACTOR, TEST DIRECTOR, AND REPORT WRITER.
TENNESSEE VALLEY AUTHORITY WIDOWS CREEK 7 RETROFIT 575 MW (GROSS) 575 MW (ESC) COAL 3.70 %S BITUMINOUS LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 3/81	WIDOWS CREEK 7 IS A PULVERIZED BITUMINOUS COAL (3.7% S, 11,100 BTU/LB) FIRED BOILER OF TVA LOCATED IN BRIDGEPORT, ALABAMA. COMBUSTION ENGINEERING SUPPLIED A LIMESTONE VENTRI ROD SCRUBBER/SPRAY TOWER ABSORBER FGD SYSTEM ON THIS UNIT. AN ESP PRECEDES THE SCRUBBING TRAIN, AND A COMBINATION OF A BULK ENTRAINMENT SEPERATOR, TWO CHEVRON MIST ELIMINATORS AND A FINNED TUBE REHEATER FOLLOWS THE SYSTEM. THE SCRUBBER SLUDGE IS DISPOSED OF ON A SLUDGE POND. OPERATIONS COMMENCED IN MARCH 1981.
TENNESSEE VALLEY AUTHORITY WIDOWS CREEK 8 RETROFIT 550 MW (GROSS) 550 MW (ESC) COAL 3.70 %S BITUMINOUS LIMESTONE TENNESSEE VALLEY AUTHORITY ENERGY CONSUMPTION: 4.7% STATUS 1 STARTUP 5/77	WIDOWS CREEK 8 OF TVA IS A BALANCED DRAFT, TANGENTIALLY FIRED COAL (3.7% S, 10,000 BTU/LB) BOILER IN BRIDGEPORT, ALABAMA. TVA RETROFITTED THIS UNIT WITH A LIMESTONE FGD SYSTEM (80% DESIGN SO2 REMOVAL EFFICIENCY) WHICH BEGAN OPERATIONS IN MAY 1977. AN ESP PRECEDES FOUR VARIABLE THROAT VENTURI SCRUBBER/MULTIGRID TOWER ABSORBER TRAINS (ONE OF THE TOWERS IS PACKED). ONE VERTICAL CHEVRON/TRAIN AND AN INDIRECT HOT AIR REHEATER ARE INCLUDED IN THE SYSTEM. SLUDGE FROM THE FGD SYSTEM IS PONDED.
TEXAS MUNICIPAL POWER AGENCY GIBBONS CREEK 1 NEW 443 MW (GROSS) 400 MW (ESC) COAL 1.06 %S LIGNITE LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: 1.4% STATUS 2 STARTUP 10/82	GIBBONS CREEK 1 OF THE TEXAS MUNICIPAL POWER AGENCY IS A DRY BOTTOM PULVERIZED LIGNITE (1.06% S, 4860 BTU/LB) FIRED UNIT PLANNED FOR LOCATION IN CARLOS, TEXAS. THE EMISSION CONTROL SYSTEM WILL CONSIST OF A COLD SIDE ESP FOLLOWED BY THREE 50% CAPACITY LIMESTONE SPRAY TOWERS. A CONTRACT HAS BEEN AWARDED TO COMBUSTION ENGINEERING FOR THE FGD SYSTEM, WHICH INCLUDES A CHEVRON MIST ELIMINATOR AND A STEAM COIL REHEATER. CLEANED FLUE GAS WILL BE DISCHARGED THROUGH A 465 FOOT ACID BRICK LINED STACK. THE POZ-O-TEC STABILIZED SLUDGE WILL BE USED AS STRIP MINE LANDFILL. START-UP IS EXPECTED IN OCTOBER 1982.
TEXAS POWER & LIGHT SANDOW 4 NEW 545 MW (GROSS) 382 MW (ESC) COAL 1.60 %S LIGNITE LIMESTONE COMBUSTION ENGINEERING ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 12/80	SANDOW 4 IS A PULVERIZED 1.6% SULFUR LIGNITE FIRED BOILER OF TEXAS POWER AND LIGHT LOCATED IN ROCKDALE, TEXAS. COMBUSTION ENGINEERING HAS SUPPLIED THREE LIMESTONE SPRAY TOWERS FOR THIS UNIT. A COLD SIDE ESP IS PROVIDING PRIMARY PARTICULATE CONTROL. A 30% BYPASS REHEAT IS BEING USED, AND THE OVERALL SO2 REMOVAL EFFICIENCY IS 75%. THE SYSTEM OPERATES IN A CLOSED WATER LOOP, AND THE SLUDGE IS BEING PONDED. OPERATIONS COMMENCED IN DECEMBER 1980.
TEXAS POWER & LIGHT TWIN OAKS 1 NEW 750 MW (GROSS) 750 MW (ESC) COAL .70 %S LIGNITE LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 8/85	TWIN OAKS 1 IS A 0.70% SULFUR LIGNITE FIRED BOILER PLANNED BY TEXAS POWER AND LIGHT AND ALCOA FOR LOCATION IN BREMOND, TEXAS. A CONTRACT HAS BEEN AWARDED TO GEESI FOR A LIMESTONE FGD SYSTEM ON THIS UNIT. START-UP IS EXPECTED IN AUGUST 1985.

UNIT IDENTIFICATION	ABSTRACT
TEXAS POWER & LIGHT TWIN OAKS 2 NEW 750 MW (GROSS) 750 MW (ESC) COAL .70 %S LIGNITE LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 8/87	TWIN OAKS 2 IS A 0.70% SULFUR LIGNITE FIRED BOILER PLANNED BY TEXAS POWER AND LIGHT AND ALCOA FOR LOCATION IN BREMOND, TEXAS. A CONTRACT HAS BEEN AWARDED TO GEESI FOR A LIMESTONE FGD SYSTEM ON THIS UNIT. START-UP IS EXPECTED IN AUGUST 1987.
TEXAS UTILITIES FOREST GROVE 1 NEW 750 MW (GROSS) 750 MW (ESC) COAL .80 %S LIGNITE PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 5 STARTUP 0/87	TEXAS UTILITIES IS PLANNING A LIGNITE (0.8% S, 7000 BTU/LB) FIRED BOILER, FOREST GROVE 1, WHICH WILL BE LOCATED IN ATHENS, TEXAS. THE UTILITY IS PRESENTLY REQUESTING BIDS ON AN FGD SYSTEM FOR THIS UNIT. TWO ESP'S WILL PROVIDE PRIMARY PARTICULATE CONTROL, AND NO STACK GAS REHEAT IS PLANNED. START-UP IS EXPECTED IN LATE 1987.
TEXAS UTILITIES MARTIN LAKE 1 NEW 793 MW (GROSS) 595 MW (ESC) COAL .90 %S LIGNITE LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 1.3% STATUS 1 STARTUP 4/77	TEXAS UTILITIES' MARTIN LAKE 1 IS A LIGNITE (0.9% S, 7380 BTU/LB) FIRED BOILER IN TATUM, TEXAS. THIS UNIT IS EQUIPPED WITH AN EMISSION CONTROL SYSTEM WHICH INCLUDES A COLD SIDE ESP AND A LIMESTONE FGD SYSTEM, BOTH SUPPLIED BY RESEARCH COTTRELL. THE FGD SYSTEM CONSISTS OF SIX PACKED SPRAY TOWER ABSORBERS WHICH TREAT 75% OF THE TOTAL BOILER FLUE GAS. THE REMAINING FLUE GAS IS BYPASSED FOR REHEAT. THE TOTAL DESIGN SO2 REMOVAL EFFICIENCY IS 70.5%. TWO CHEVRONS/MODULE PROVIDE MIST ELIMINATION. THE FLUE GAS CLEANING WASTES ARE FLYASH STABILIZED AND DISPOSED IN AN ON-SITE LANDFILL. THE SYSTEM OPERATES IN A CLOSED WATER LOOP. INITIAL SYSTEM OPERATIONS TOOK PLACE IN APRIL 1977.
TEXAS UTILITIES MARTIN LAKE 2 NEW 793 MW (GROSS) 595 MW (ESC) COAL .90 %S LIGNITE LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 1.3% STATUS 1 STARTUP 5/78	TEXAS UTILITIES' MARTIN LAKE 2 IS A LIGNITE (0.9% S, 7380 BTU/LB) FIRED BOILER IN TATUM, TEXAS. THIS UNIT IS EQUIPPED WITH AN EMISSION CONTROL SYSTEM WHICH INCLUDES A COLD SIDE ESP AND A LIMESTONE FGD SYSTEM, BOTH SUPPLIED BY RESEARCH COTTRELL. THE FGD SYSTEM CONSISTS OF SIX PACKED SPRAY TOWER ABSORBERS WHICH TREAT 75% OF THE TOTAL BOILER FLUE GAS. THE REMAINING FLUE GAS IS BYPASSED FOR REHEAT. THE TOTAL DESIGN SO2 REMOVAL EFFICIENCY IS 70.5%. TWO CHEVRONS/MODULE PROVIDE MIST ELIMINATION. THE FLUE GAS CLEANING WASTES ARE FLYASH STABILIZED AND DISPOSED IN AN ON-SITE LANDFILL. THE SYSTEM OPERATES IN A CLOSED WATER LOOP. INITIAL SYSTEM OPERATIONS TOOK PLACE IN MAY 1978.
TEXAS UTILITIES MARTIN LAKE 3 NEW 793 MW (GROSS) 595 MW (ESC) COAL .90 %S LIGNITE LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: 1.3% STATUS 1 STARTUP 2/79	TEXAS UTILITIES' MARTIN LAKE 3 IS A LIGNITE (0.9% S, 7380 BTU/LB) FIRED BOILER IN TATUM, TEXAS. THIS UNIT IS EQUIPPED WITH AN EMISSION CONTROL SYSTEM WHICH INCLUDES A COLD SIDE ESP AND A LIMESTONE FGD SYSTEM, BOTH SUPPLIED BY RESEARCH COTTRELL. THE FGD SYSTEM CONSISTS OF SIX PACKED SPRAY TOWER ABSORBERS WHICH TREAT 75% OF THE TOTAL BOILER FLUE GAS. THE REMAINING FLUE GAS IS BYPASSED FOR REHEAT. THE TOTAL DESIGN SO2 REMOVAL EFFICIENCY IS 70.5%. TWO CHEVRONS/MODULE PROVIDE MIST ELIMINATION. THE FLUE GAS CLEANING WASTES ARE FLYASH STABILIZED AND DISPOSED IN AN ON-SITE LANDFILL. THE SYSTEM OPERATES IN A CLOSED WATER LOOP. INITIAL SYSTEM OPERATIONS TOOK PLACE IN FEBRUARY 1979.
TEXAS UTILITIES MARTIN LAKE 4 NEW 750 MW (GROSS) 750 MW (ESC) COAL .90 %S LIGNITE LIMESTONE RESEARCH-COTTRELL ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 0/89	MARTIN LAKE 4 OF TEXAS UTILITIES IS A LIGNITE (0.9% S, 7380 BTU/LB) FIRED BOILER UNDER CONSTRUCTION IN TATUM, TEXAS. A CONTRACT FOR A LIMESTONE FGD SYSTEM FOR THIS UNIT HAS BEEN AWARDED TO RESEARCH COTTRELL. CONSTRUCTION HAS NOT YET BEGUN ON THE FGD SYSTEM. FGD START-UP IS EXPECTED IN 1989.

UNIT IDENTIFICATION	ABSTRACT
TEXAS UTILITIES MILL CREEK 1 NEW 750 MW (GROSS) 750 MW (ESC) COAL ***** %S LIGNITE PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/87	MILL CREEK 1 OF TEXAS UTILITIES IS A PLANNED LIGNITE FIRED UNIT TO BE LOCATED IN HENDERSON, TEXAS. THE UTILITY WILL INCLUDE AN FGD SYSTEM ON THIS UNIT, BUT NO DECISIONS HAVE BEEN MADE AS TO THE PROCESS TYPE OR VENDOR. ESP'S WILL PROVIDE PRIMARY PARTICLE CONTROL. START-UP IS EXPECTED IN 1987.
TEXAS UTILITIES MILL CREEK 2 NEW 750 MW (GROSS) 750 MW (ESC) COAL ***** %S LIGNITE PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/88	MILL CREEK 2 OF TEXAS UTILITIES IS A PLANNED LIGNITE FIRED UNIT TO BE LOCATED IN HENDERSON, TEXAS. THE UTILITY WILL INCLUDE AN FGD SYSTEM ON THIS UNIT, BUT NO DECISIONS HAVE BEEN MADE AS TO THE PROCESS TYPE OR VENDOR. ESP'S WILL PROVIDE PRIMARY PARTICLE CONTROL. START-UP IS EXPECTED IN 1988.
TEXAS UTILITIES MONTICELLO 3 NEW 800 MW (GROSS) 800 MW (ESC) COAL 1.50 %S LIGNITE LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 5/78	MONTICELLO 3 OF TEXAS UTILITIES IS A LIGNITE (1.5% S, 7000 BTU/LB) FIRED UNIT IN MT. PLEASANT, TEXAS. THIS UNIT'S EMISSION CONTROL SYSTEM CONSISTS OF TWO COLD SIDE ESP'S FOLLOWED BY THREE GEESI LIMESTONE SPRAY TOWERS (74% DESIGN SO2 REMOVAL EFFICIENCY), ONE HORIZONTAL CHEVRON MIST ELIMINATOR/MODULE, AND AN INDIRECT HOT AIR REHEATER. THE WATER LOOP IS CLOSED, AND THE FLYASH STABILIZED SLUDGE IS DISPOSED IN AN ON SITE LANDFILL. THIS SYSTEM HAS BEEN OPERATIONAL SINCE MAY 1978.
TUCSON ELECTRIC POWER SPRINGERVILLE 1 NEW 370 MW (GROSS) 370 MW (ESC) COAL .61 %S SUBBITUMINOUS LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 2/85	TUCSON ELECTRIC POWER WILL BE BUILDING TWO NEW UNITS IN SPRINGERVILLE, ARIZONA, SPRINGERVILLE 1 AND 2. THE UNITS WILL FIRE PULVERIZED SUBBITUMINOUS COAL (0.53-0.69% S AND 8500-8900 BTU/LB). A CONTRACT HAS BEEN AWARDED TO JOY MANUFACTURING/NIRO ATOMIZER FOR A LIME/SPRAY DRYING FGD SYSTEM TO CONTROL PARTICULATE MATTER AND SO2 EMISSIONS. THE SYSTEM WILL BE DESIGNED TO ACCOMODATE A REHEATER (SHOULD ONE BE REQUIRED) AND WILL OPERATE IN A CLOSED WATER LOOP. CLEANED FLUE GAS WILL EXIT THE SYSTEM VIA A 500 FOOT CONCRETE STACK. START-UP IS SCHEDULED FOR FEBRUARY 1985.
TUCSON ELECTRIC POWER SPRINGERVILLE 2 NEW 370 MW (GROSS) 370 MW (ESC) COAL .61 %S SUBBITUMINOUS LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 3/87	TUCSON GAS AND ELECTRIC WILL BE BUILDING TWO NEW UNITS IN SPRINGERVILLE, ARIZONA, SPRINGERVILLE 1 AND 2. THE UNITS WILL FIRE PULVERIZED SUBBITUMINOUS COAL (0.53-0.69% S AND 8500-8900 BTU/LB). A CONTRACT HAS BEEN AWARDED TO JOY MANUFACTURING/NIRO ATOMIZER FOR A LIME/SPRAY DRYING FGD SYSTEM TO CONTROL PARTICULATE MATTER AND SO2 EMISSIONS. THE SYSTEM WILL BE DESIGNED TO ACCOMODATE A REHEATER (SHOULD ONE BE REQUIRED) AND WILL OPERATE IN A CLOSED WATER LOOP. CLEANED FLUE GAS WILL EXIT THE SYSTEM VIA A 500 FOOT CONCRETE STACK. START-UP IS SCHEDULED FOR MARCH 1987.
UNITED POWER ASSOCIATION STANTON 1A NEW 60 MW (GROSS) 50 MW (ESC) COAL .77 %S LIGNITE LIME/SPRAY DRYING RESEARCH-COTTRELL ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 6/82	STANTON 1A OF THE UNITED POWER ASSOCIATION IS A PULVERIZED COAL (0.77% S, 7000 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN STANTON, NORTH DAKOTA. A CONTRACT HAS BEEN AWARDED TO KOMLINE AND SANDERSON FOR A LIME SPRAY DRYER. A FABRIC FILTER SUPPLIED BY RESEARCH COTTRELL WILL BE DESIGNED TO REMOVE 99% OF THE PARTICULATE. THE SYSTEM WILL OPERATE IN AN OPEN LOOP MODE WITH SLUDGE DISPOSAL TO BE IN A CLAY LINED SETTLING POND. OPERATIONS ARE SCHEDULED TO COMMENCE IN JUNE 1982.

SECTION 2
STATUS OF FGD SYSTEMS

UNIT IDENTIFICATION	ABSTRACT
UTAH POWER & LIGHT HUNTER 1 NEW 400 MW (GROSS) 360 MW (ESC) COAL .55 %S BITUMINOUS LIME GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 5/79	HUNTER 1 OF UTAH POWER AND LIGHT IS A COAL (0.55% S, 12,500 BTU/LB) FIRED UNIT IN CASTLEDALE, UTAH. GEESI SUPPLIED A PEBBLE LIME WET SCRUBBING SYSTEM WHICH BECAME OPERATIONAL IN MAY 1979. THE SCRUBBING SYSTEM IS DESIGNED TO OPERATE IN AN OPEN WATER LOOP WITH AN SO2 REMOVAL EFFICIENCY OF 80%. PRIMARY PARTICULATE CONTROL IS PROVIDED BY AN UPSTREAM ESP, AND STACK GAS REHEAT IS PROVIDED BY BYPASS. THE SLUDGE IS FLYASH STABILIZED AND DISPOSED ON-SITE.
UTAH POWER & LIGHT HUNTER 2 NEW 400 MW (GROSS) 360 MW (ESC) COAL .55 %S LIME GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 1 STARTUP 6/80	UTAH POWER AND LIGHT'S HUNTER 2 IS A COAL (0.55% S, 12,500 BTU/LB) FIRED UNIT LOCATED IN CASTLEDALE, UTAH. FOR EMISSION CONTROL, GEESI SUPPLIED A PEBBLE LIME WET SCRUBBING SYSTEM DESIGNED TO OPERATE IN AN OPEN WATER LOOP WITH AN SO2 REMOVAL EFFICIENCY OF 80%. AN UPSTREAM ESP PROVIDES PRIMARY PARTICLE CONTROL, AND A BYPASS SYSTEM PROVIDES STACK GAS REHEAT. THE SLUDGE IS FLYASH STABILIZED AND DISPOSED OF ON-SITE. START-UP OF BOTH THE BOILER AND FGD SYSTEM TOOK PLACE IN JUNE 1980.
UTAH POWER & LIGHT HUNTER 3 NEW 400 MW (GROSS) 400 MW (ESC) COAL .55 %S BITUMINOUS LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 6/83	HUNTER 3 OF UTAH POWER AND LIGHT IS A PULVERIZED COAL (0.55% S, 12500 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN CASTLEDALE, UTAH. A CONTRACT HAS BEEN AWARDED TO GEESI FOR A LIMESTONE, NONREGENERABLE FGD UNIT FOR EMISSION CONTROL. INITIAL OPERATIONS ARE SCHEDULED TO COMMENCE IN JUNE 1983.
UTAH POWER & LIGHT HUNTER 4 NEW 400 MW (GROSS) 400 MW (ESC) COAL .55 %S BITUMINOUS LIMESTONE GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 2 STARTUP 6/85	HUNTER 4 OF UTAH POWER AND LIGHT IS A PULVERIZED COAL (0.55% S, 12500 BTU/LB) FIRED UNIT UNDER CONSTRUCTION IN CASTELDALE, UTAH. A CONTRACT HAS BEEN AWARDED TO GEESI FOR A LIMESTONE, NONREGENERABLE FGD UNIT FOR EMISSION CONTROL. INITIAL OPERATIONS ARE SCHEDULED TO COMMENCE IN JUNE 1985.
UTAH POWER & LIGHT HUNTINGTON 1 NEW 430 MW (GROSS) 366 MW (ESC) COAL .55 %S BITUMINOUS LIME GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: 1.6% STATUS 1 STARTUP 5/78	HUNTINGTON 1 OF UTAH POWER IS A TANGENTIALLY FIRED PULVERIZED COAL (0.55% S, 12,500 BTU/LB) BOILER IN PRICE, UTAH. A COLD SIDE ESP TREATS 1,742,000 ACFM OF FLUE GAS AND IS FOLLOWED BY A GEESI LIME FGD SYSTEM CONSISTING OF FOUR SPRAY TOWERS (80% DESIGN EFFICIENCY). ONE FOUR PASS CHEVRON/MODULE PROVIDES MIST ELIMINATION, AND A COMBINATION OF A STEAM TUBE AND 10-20% BYPASS REHEATERS BOOST THE GAS TEMPERATURE 45-50 DEG F. THE SYSTEM OPERATES IN A CLOSED WATER LOOP, AND THE FLYASH STABILIZED SLUDGE IS TRUCKED TO AN ON-SITE LANDFILL. THE SYSTEM INCLUDES A 600 FOOT ACID BRICK LINED STACK, AND HAS BEEN OPERATIONAL SINCE MAY 1978.
UTAH POWER & LIGHT NAUGHTON 3 RETROFIT 330 MW (GROSS) 330 MW (ESC) COAL .55 %S SUBBITUMINOUS SODIUM CARBONATE AIR CORRECTION DIVISION, UOP ENERGY CONSUMPTION: 1.5% STATUS 1 STARTUP 9/81	NAUGHTON 3 OF UTAH POWER AND LIGHT IS A PULVERIZED COAL (.5% S, 9500 BTU/LB) FIRED BOILER LOCATED IN KEMMERER, WYOMING. THE BOILER SUPPLIES 1,500,000 ACFM OF FLUE GAS TO AN ESP FOR PARTICULATE MATTER CONTROL. THE UNIT WAS RETROFITTED WITH A UOP WET SODA ASH FGD SYSTEM FOR SO2 CONTROL. THE FGD SYSTEM IS DESIGNED TO REMOVE 70% OF THE SO2 BEFORE THE FLUE GAS EXITS OUT A 475 FOOT STACK. INITIAL START-UP TOOK PLACE IN SEPTEMBER 1981.

UNIT IDENTIFICATION	ABSTRACT
WASHINGTON WATER POWER CRESTON COAL 1 NEW 570 MW (GROSS) 570 MW (ESC) COAL ***** %S UNKNOWN LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/87	WASHINGTON WATER POWER HAS PLANS FOR A NEW UNIT, CRESTON COAL 1, TO BE LOCATED IN CRESTON, WASHINGTON. THE COAL FIRED BOILER WILL HAVE A GROSS GENERATING CAPACITY OF 570 MW AND WILL UTILIZE A WET LIMESTONE FGD SYSTEM FOR CONTROL OF SO2 EMISSIONS. FGD OPERATIONS ARE SCHEDULED TO COMMENCE IN 1987.
WASHINGTON WATER POWER CRESTON COAL 2 NEW 570 MW (GROSS) 570 MW (ESC) COAL ***** %S UNKNOWN LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/87	WASHINGTON WATER POWER HAS PLANS FOR A NEW UNIT, CRESTON 2, TO BE LOCATED IN CRESTON, WASHINGTON. THE COAL FIRED BOILER WILL HAVE A GROSS GENERATING CAPACITY OF 570 MW AND WILL USE A WET LIMESTONE FGD SYSTEM FOR CONTROL OF SO2 EMISSIONS. FGD OPERATIONS ARE SCHEDULED TO COMMENCE IN 1987.
WASHINGTON WATER POWER CRESTON COAL 3 NEW 570 MW (GROSS) 570 MW (ESC) COAL ***** %S UNKNOWN LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: 12.3% STATUS 6 STARTUP 0/87	WASHINGTON WATER POWER HAS PLANS FOR A NEW UNIT, CRESTON 3, TO BE LOCATED IN CRESTON, WASHINGTON. THE COAL FIRED BOILER WILL HAVE A GROSS GENERATING CAPACITY OF 570 MW AND WILL USE A WET LIMESTONE FGD SYSTEM FOR CONTROL OF SO2 EMISSIONS. FGD OPERATIONS ARE SCHEDULED TO COMMENCE IN 1987.
WASHINGTON WATER POWER CRESTON COAL 4 NEW 570 MW (GROSS) 570 MW (ESC) COAL ***** %S UNKNOWN LIMESTONE VENDOR NOT SELECTED ENERGY CONSUMPTION: 12.3% STATUS 6 STARTUP 0/87	WASHINGTON WATER POWER HAS PLANS FOR A NEW UNIT, CRESTON 4, TO BE LOCATED IN CRESTON, WASHINGTON. THE COAL FIRED BOILER WILL HAVE A GROSS GENERATING CAPACITY OF 570 MW AND WILL USE A WET LIMESTONE FGD SYSTEM FOR CONTROL OF SO2 EMISSIONS. FGD OPERATIONS ARE SCHEDULED TO COMMENCE IN 1987.
WEST PENN POWER MITCHELL 33 RETROFIT 300 MW (GROSS) 300 MW (ESC) COAL 2.80 %S BITUMINOUS LIME GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: 1.0% STATUS 2 STARTUP 8/82	UNIT 33 AT ALLEGHENY POWER SYSTEM'S MITCHELL POWER STATION IN COURTNEY, PENNSYLVANIA IS A 2.8% SULFUR COAL FIRED BOILER UNDER CONSTRUCTION. A CONTRACT WAS AWARDED TO GEESI FOR A LIME SCRUBBING PROCESS. THE SYSTEM WILL BE DESIGNED WITH AN SO2 REMOVAL EFFICIENCY OF 95%. START UP IS SCHEDULED FOR AUGUST 1982.
WEST TEXAS UTILITIES OKLAUNION 1 NEW 720 MW (GROSS) 504 MW (ESC) COAL .34 %S SUBBITUMINOUS PROCESS NOT SELECTED GE ENVIRONMENTAL SERVICES ENERGY CONSUMPTION: ****% STATUS 3 STARTUP 12/86	WEST TEXAS UTILITIES HAS PLANS TO BUILD TWO PULVERIZED COAL FIRED BOILERS TO BE LOCATED NEAR OKLAUNION, TEXAS. THE UTILITY HAS SIGNED A CONTRACT WITH GENERAL ELECTRIC ENVIRONMENTAL SERVICES FOR AN FGD SYSTEM TO CONTROL SO2 EMISSIONS FROM THIS UNIT. INITIAL OPERATIONS ARE SCHEDULED FOR 12/86.

UNIT IDENTIFICATION	ABSTRACT
WEST TEXAS UTILITIES OKLAUNION 2 NEW 720 MW (GROSS) 720 MW (ESC) COAL .34 %S SUBBITUMINOUS PROCESS NOT SELECTED VENDOR NOT SELECTED ENERGY CONSUMPTION: ****% STATUS 6 STARTUP 0/90	WEST TEXAS UTILITIES HAS PLANS TO BUILD TWO PULVERIZED COAL FIRED BOILERS TO BE LOCATED NEAR OKLAUNION, TEXAS. THE UTILITY WILL INCLUDE AN FGD SYSTEM FOR EMISSION CONTROL FROM THE 720 MW UNIT. THE OKLAUNION 2 PLANT IS SCHEDULED TO COMMENCE OPERATIONS IN 1990.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ALABAMA ELECTRIC
PLANT NAME	TOMBIGBEE
UNIT NUMBER	2
CITY	LEROY
STATE	ALABAMA
GROSS UNIT GENERATING CAPACITY - MW	255
NET UNIT GENERATING CAPACITY W/FGD - MW	235
EQUIVALENT SCRUBBED CAPACITY - MW	179

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
AVERAGE ASH CONTENT - %	14.00	
AVERAGE MOISTURE CONTENT - %	7.00	
AVERAGE SULFUR CONTENT - %	1.15	
AVERAGE CHLORIDE CONTENT - %	.04	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.30
SO2 DESIGN REMOVAL EFFICIENCY - %	59.50
ENERGY CONSUMPTION - %	3.1
COMMERIAL START-UP DATE	9/78
INITIAL START-UP DATE	9/78
CONTRACT AWARDED	8/75

*** SLUDGE

** TREATMENT

METHOD	BLEED

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE FIRST QUARTER 1981 WAS NOT AVAILABLE AT THIS TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

ALABAMA ELECTRIC: TOMBIGBEE 2 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ALABAMA ELECTRIC
PLANT NAME	TOMBIGBEE
UNIT NUMBER	3
CITY	LEROY
STATE	ALABAMA
GROSS UNIT GENERATING CAPACITY - MW	255
NET UNIT GENERATING CAPACITY W/FGD - MW	235
EQUIVALENT SCRUBBED CAPACITY - MW	179
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	26749. (11500 BTU/LB)
AVERAGE ASH CONTENT - %	14.00
AVERAGE MOISTURE CONTENT - %	7.00
AVERAGE SULFUR CONTENT - %	1.15
AVERAGE CHLORIDE CONTENT - %	.04
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.30
SO2 DESIGN REMOVAL EFFICIENCY - %	59.50
ENERGY CONSUMPTION - %	3.1
COMMERIAL START-UP DATE	6/79
INITIAL START-UP DATE	6/79
CONTRACT AWARDED	8/75
*** SLUDGE	
** TREATMENT	
METHOD	BLEED
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE FIRST QUARTER 1981 WAS NOT AVAILABLE AT THIS TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

EPA UTILITY FGD SURVEY: JULY - SEPTEMBER 1981

ALABAMA ELECTRIC: TOMBIGBEE 3 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA ELECTRIC POWER
PLANT NAME	APACHE
UNIT NUMBER	2
CITY	COCHISE
STATE	ARIZONA
GROSS UNIT GENERATING CAPACITY - MW	195
NET UNIT GENERATING CAPACITY W/FGD - MW	175
EQUIVALENT SCRUBBED CAPACITY - MW	98

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
AVERAGE ASH CONTENT - %	17.00	
AVERAGE MOISTURE CONTENT - %	12.00	
AVERAGE SULFUR CONTENT - %	.50	
AVERAGE CHLORIDE CONTENT - %	********	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	42.50
ENERGY CONSUMPTION - %	4.1
COMMERIAL START-UP DATE	1/79
INITIAL START-UP DATE	8/78
CONTRACT AWARDED	7/74

*** SLUDGE

** TREATMENT

METHOD	BLEED

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	100.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	202	100.0	62.9	100.0	62.9						
	203	.0	.0		.0						
	SYSTEM	100.0	62.9	100.0	62.9			744	744	468	86.6

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 202 WAS NOT OPERATED DURING THE LAST 276 HOURS OF THE MONTH AS A RESULT OF THE LOW SULFUR CONTENT OF THE COAL BEING FIRED.

MODULE 203 WAS NOT AVAILABLE FOR OPERATION DURING JANUARY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	202	100.0	10.7	100.0	10.7						
	203	.0	.0		.0						
	SYSTEM	100.0	10.7	100.0	10.7			672	672	72	77.4

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

```
------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

        ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING FEBRUARY THE OPERATION OF THE FGD SYSTEM WAS REDUCED DUE TO THE LOW
                             SULFUR CONTENT OF THE COAL.

                             REPAIRS WERE MADE ON TOWER 203 DURING FEBRUARY.

 3/81  202            .0          .0                      .0
       203         100.0        53.7        100.0        43.7
       SYSTEM      100.0        53.6        100.0        43.7                   744   605    325  70.2

        ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING MARCH MODULE 202 WAS NOT AVAILABLE DUE TO EROSION PROBLEMS.

                             THE SYSTEM WAS BY-PASSED DURING PART OF THE MONTH BECAUSE THE UNIT WAS
                             FIRING LOW SULFUR COAL.

 4/81  202            .0          .0                      .0
       203         100.0       100.0        100.0       100.0
       SYSTEM      100.0       100.0        100.0       100.0                   720   720    720  98.2

        ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING APRIL MODULE 202 WAS NOT AVAILABLE FOR OPERATION DUE TO ERROSION
                             OF THE BOWL AREA OF THE MODULE.  THIS HAS BEEN A CONTINUAL PROBLEM AND
                             THE UTILITY IS PRESENTLY CONDUCTING STUDIES TO ALLEVIATE THE PROBLEM.

 5/81  202         100.0          .0                      .0
       203         100.0       100.0        100.0       100.0
       SYSTEM      100.0       100.0        100.0       100.0                   744   744    744  87.4

        ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING MAY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE
                             ENCOUNTERED.

                             MODULE 202 WAS AVAILABLE THE ENTIRE MONTH, BUT WAS NOT OPERATED.

 6/81  202         100.0          .0                      .0
       203         100.0       100.0        100.0       100.0
       SYSTEM      100.0       100.0        100.0       100.0                   720   716    720  91.9

        ** PROBLEMS/SOLUTIONS/COMMENTS

                             THE UTILITY REPORTED THAT NO MAJOR PROBLEMS WERE EXPERIENCED DURING THE
                             MONTH OF JUNE.

 7/81  202         100.0        45.2        100.0        45.2
       203          46.2        46.2        100.0        46.2
       SYSTEM      100.0        91.4        100.0        91.4                   744   744    680  91.0

        ** PROBLEMS/SOLUTIONS/COMMENTS

                             MODULE 203 WAS TAKEN OUT OF SERVICE ON JULY 15 FOR PREVENTIVE MAINTENANCE
                             AND REPAIRS, AT WHICH TIME MODULE 202 WAS PUT INTO SERVICE.

 8/81  202         100.0        39.9        100.0        35.5
       203            .0          .0                      .0
       SYSTEM      100.0        39.9        100.0        35.5                   744   661    264  75.2
```

ARIZONA ELECTRIC POWER: APACHE 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 202 WAS REMOVED FROM SERVICE ON AUGUST 8 AS A RESULT OF PROBLEMS ENCOUNTERED WITH THE ELECTROSTATIC PRECIPITATOR. THE MODULE WAS PLACED BACK IN SERVICE ON AUGUST 21.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	202	100.0	99.3	100.0	99.0						
	203	.0	.0		.0						
	SYSTEM	100.0	99.3	100.0	99.0			720	718	713	85.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY PROBLEMS ENCOUNTERED DURING THE MONTH WERE BOILER RELATED.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA ELECTRIC POWER	
PLANT NAME	APACHE	
UNIT NUMBER	3	
CITY	COCHISE	
STATE	ARIZONA	
GROSS UNIT GENERATING CAPACITY - MW	195	
NET UNIT GENERATING CAPACITY W/FGD - MW	175	
EQUIVALENT SCRUBBED CAPACITY - MW	98	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
AVERAGE ASH CONTENT - %	17.00	
AVERAGE MOISTURE CONTENT - %	12.00	
AVERAGE SULFUR CONTENT - %	.50	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	RESEARCH-COTTRELL	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50	
SO2 DESIGN REMOVAL EFFICIENCY - %	42.50	
ENERGY CONSUMPTION - %	4.1	
COMMERIAL START-UP DATE	4/79	
INITIAL START-UP DATE	6/79	
CONTRACT AWARDED	8/74	
*** SLUDGE		
** TREATMENT		
METHOD	BLEED	
** DISPOSAL		
TYPE	POND	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	100.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	1.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	302	.0	.0		.0						
	303	100.0	52.9	100.0	46.1						
	SYSTEM	100.0	52.9	100.0	46.1			744	649	343	80.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 123 HOURS DURING JANUARY.

MODULE 303 WAS TAKEN OUT OF SERVICE FOR APPROXIMATELY 272 HOURS DUE TO THE LOW SULFUR CONTENT OF THE COAL. MODULE 302 WAS NOT AVAILABLE FOR OPERATION DURING JANUARY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	302	.0	.0		.0						
	303	100.0	27.4	100.0	27.4						
	SYSTEM	100.0	27.4	100.0	27.4			672	672	184	95.6

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE OPERATION OF THE FGD SYSTEM WAS REDUCED DUE TO THE LOW SULFUR CONTENT OF THE COAL.

REPAIRS WERE MADE ON TOWER 302 DURING THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	302	78.5	23.7	52.5	23.7						
	303	.0	.0		.0						
	SYSTEM	78.5	23.7	52.5	23.7			744	744	177	87.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH LOW OPERABILITY OF MODULE 302 WAS DUE TO THE FIRING OF LOW SULFUR COAL.

MODULE 303 WAS UNAVAILABLE DUE TO A MALFUNCTION OF THE LIMESTONE GRINDING CIRCUIT.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	302	100.0	75.3	100.0	35.8						
	303	.0	.0		.0						
	SYSTEM	100.0	75.3	100.0	35.8			720	342	258	44.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS UNAVAILABLE DUE TO A 2 WEEK SCHEDULED MAINTENANCE OUTAGE.

MODULE 303 WAS NOT AVAILABLE FOR OPERATION DUE TO ERROSION PROBLEMS DISCOVERED IN THE MODULE BOWL AREA. THIS HAS BEEN A CONTINUAL PROBLEM AND THE UTILITY IS PRESENTLY CONDUCTING STUDIES TO ALLEVIATE THE PROBLEM.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	302	100.0	87.1	100.0	87.1						
	303	100.0	.0		.0						
	SYSTEM	100.0	87.1	100.0	87.1			744	648	648	90.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE BOILER WAS TAKEN OUT OF SERVICE APPROXIMATELY 96 HOURS DUE TO MAINTENANCE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	302	100.0	86.7	100.0	86.7						
	303	100.0	.0		.0						
	SYSTEM	100.0	86.7	100.0	86.7			720	720	624	87.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE MODULE 303 WAS OUT OF SERVICE DUE TO REPAIRS ON THE ESP.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	302	45.2	11.9	100.0	10.8						
	303	100.0	57.3	100.0	51.6						
	SYSTEM	100.0	69.2	100.0	69.2			744	670	464	77.6

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 302 WAS REMOVED FROM SERVICE ON JULY 1 AS A RESULT OF PROBLEMS WITH THE ELECTROSTATIC PRECIPITATOR. MODULE 303 WAS PLACED IN SERVICE ON JULY 17 SO THAT PREVENTIVE MAINTENANCE COULD BE PERFORMED ON MODULE 302.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	302	.0	.0		.0						
	303	100.0	100.0	100.0	100.0						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	89.1

ARIZONA ELECTRIC POWER: APACHE 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	302	.0	.0		.0						
	303	62.4	62.5	62.4	62.4						
	SYSTEM	62.4	62.5	62.4	62.4			720	718	449	80.8

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 303 WAS OFF LINE FOR APPROXIMATELY ELEVEN DAYS DURING SEPTEMBER AS A RESULT OF A MALFUNCTION THAT CAUSED THE INLET AND OUTLET DAMPERS TO CLOSE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	CHOLLA	
UNIT NUMBER	1	
CITY	JOSEPH CITY	
STATE	ARIZONA	
GROSS UNIT GENERATING CAPACITY - MW	119	
NET UNIT GENERATING CAPACITY W/ FGD - MW	115	
EQUIVALENT SCRUBBED CAPACITY - MW	119	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23609.	(10150 BTU/LB)
AVERAGE ASH CONTENT - %	13.50	
AVERAGE MOISTURE CONTENT - %	15.00	
AVERAGE SULFUR CONTENT - %	.50	
AVERAGE CHLORIDE CONTENT - %	.02	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	RESEARCH-COTTRELL	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	80.00	
SO2 DESIGN REMOVAL EFFICIENCY - %	58.50	
ENERGY CONSUMPTION - %	3.4	
COMMERIAL START-UP DATE	12/73	
INITIAL START-UP DATE	10/73	
CONTRACT AWARDED	7/71	
*** SLUDGE		
** TREATMENT		
METHOD	BLEED	
** DISPOSAL		
TYPE	POND	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THE FIRST QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

ARIZONA PUBLIC SERVICE: CHOLLA 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE
PLANT NAME	CHOLLA
UNIT NUMBER	2
CITY	JOSEPH CITY
STATE	ARIZONA
GROSS UNIT GENERATING CAPACITY - MW	264
NET UNIT GENERATING CAPACITY W/FGD - MW	235
EQUIVALENT SCRUBBED CAPACITY - MW	264
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	23609. (10150 BTU/LB)
AVERAGE ASH CONTENT - %	13.50
AVERAGE MOISTURE CONTENT - %	15.00
AVERAGE SULFUR CONTENT - %	.50
AVERAGE CHLORIDE CONTENT - %	.02
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.70
SO2 DESIGN REMOVAL EFFICIENCY - %	75.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	6/78
INITIAL START-UP DATE	4/78
CONTRACT AWARDED	12/74
*** SLUDGE	
** TREATMENT	
METHOD	NR
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	33.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THE FIRST QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

ARIZONA PUBLIC SERVICE: CHOLLA 2 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

COMPANY NAME	ARIZONA PUBLIC SERVICE	
PLANT NAME	CHOLLA	
UNIT NUMBER	4	
CITY	JOSEPH CITY	
STATE	ARIZONA	
REGULATORY CLASSIFICATION	C	
PARTICULATE EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J	******	(****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW	965	
GROSS UNIT GENERATING CAPACITY - MW	375	
NET UNIT GENERATING CAPACITY W/FGD - MW	350	
NET UNIT GENERATING CAPACITY WO/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	126	

** UNIT DATA - BOILER AND STACK

BOILER SUPPLIER	COMBUSTION ENGINEERING	
BOILER TYPE	PULVERIZED COAL	
BOILER SERVICE LOAD	BASE	
DESIGN BOILER FLUE GAS FLOW - CU.M/S	********	(******* ACFM)
BOILER FLUE GAS TEMPERATURE - C	*******	(**** F)
STACK HEIGHT - M	******	(**** FT)
STACK SHELL	******	
STACK TOP DIAMETER - M	*******	(***** FT)

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	23609.	(10150 BTU/LB)
RANGE HEAT CONTENT - BTU/LB		******
AVERAGE ASH CONTENT - %	13.50	
RANGE ASH CONTENT - %	******	
AVERAGE MOISTURE CONTENT - %	15.00	
RANGE MOISTURE CONTENT - %	******	
AVERAGE SULFUR CONTENT - %	.50	
RANGE SULFUR CONTENT - %	0.4-1.0	
AVERAGE CHLORIDE CONTENT - %	.02	
RANGE CHLORIDE CONTENT - %	0.01-0.04	

*** PARTICLE CONTROL

** ESP

NUMBER	1

** PARTICLE SCRUBBER

GENERIC TYPE	NONE
SPECIFIC TYPE	N/A
TRADE NAME/COMMON NAME	N/A
GAS CONTACTING DEVICE TYPE	NONE

*** FGD SYSTEM

** GENERAL DATA

SALEABLE PRODUCT/THROWAWAY PRODUCT	THROWAWAY PRODUCT
SO2 REMOVAL MODE	WET SCRUBBING
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
A-E FIRM	EBASCO
DEVELOPMENT LEVEL	FULL SCALE
NEW/RETROFIT	NEW
UNIT DESIGN SO2 REMOVAL EFFICIENCY - %	95.00
CURRENT STATUS	1
COMMERCIAL START-UP	6/81
INITIAL START-UP	3/81

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	1
GENERIC TYPE	COMBINATION
SPECIFIC TYPE	SPRAY/PACKED
TRADE NAME/COMMON TYPE	N/A
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
SO2 REMOVAL EFFICIENCY - %	95.0

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	BAFFLE
TRADE NAME/COMMON TYPE	CLOSED VANE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** REHEATER

GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

DESIGN	CENTRIFUGAL
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SLUDGE

** TREATMENT

METHOD	NA
DEVICE	NA
PROPRIETARY PROCESS	NA

ARIZONA PUBLIC SERVICE: CHOLLA 4 (CONT.)

** DISPOSAL	
NATURE	FINAL
TYPE	POND
LOCATION	ON-SITE
SITE TREATMENT	NONE
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

-----PERFORMANCE DATA-----

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

IN MARCH 1981 THE FGD SYSTEM COMMENCED OPERATIONS. THE SYSTEM OPERATED FOR APPROXIMATELY ONE WEEK BEFORE BEING TAKEN OFF LINE FOR A BEARING INSPECTION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

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                                              SECTION 3
                  DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS
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  COMPANY NAME                                       ARIZONA PUBLIC SERVICE
  PLANT NAME                                         FOUR CORNERS
  UNIT NUMBER                                        1
  CITY                                               FARMINGTON
  STATE                                              NEW MEXICO
  GROSS UNIT GENERATING CAPACITY - MW                  175
  NET UNIT GENERATING CAPACITY W/FGD - MW              175
  EQUIVALENT SCRUBBED CAPACITY - MW                    175

  ** FUEL DATA
      FUEL TYPE                                      COAL
      FUEL GRADE                                     SUBBITUMINOUS
      AVERAGE HEAT CONTENT - J/G                      20004.        (  8600 BTU/LB)
      AVERAGE ASH CONTENT - %                            22.00
      AVERAGE MOISTURE CONTENT - %                       12.30
      AVERAGE SULFUR CONTENT - %                           .75
      AVERAGE CHLORIDE CONTENT - %                         .07

 *** FGD SYSTEM

  ** GENERAL DATA
      PROCESS TYPE                                   LIME/ALKALINE FLYASH
      SYSTEM SUPPLIER                                GE ENVIRONMENTAL SERVICES
      NEW/RETROFIT                                   RETROFIT
      PARTICULATE DESIGN REMOVAL EFFICIENCY - %         99.00
      SO2 DESIGN REMOVAL EFFICIENCY - %                 80.00
      ENERGY CONSUMPTION - %                         *******
      COMMERIAL START-UP DATE                        **/**
      INITIAL START-UP DATE                          11/79
      CONTRACT AWARDED                               **/**

 *** SLUDGE

  ** TREATMENT
      METHOD                                         NR

  ** FGD SPARE CAPACITY INDICES
      ABSORBER - %                                        .0

  ** FGD SPARE COMPONENT INDICES
      ABSORBER                                            .0


------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 1/81  SYSTEM                                                                744

 2/81  SYSTEM                                                                672

 3/81  SYSTEM                                                                744

        ** PROBLEMS/SOLUTIONS/COMMENTS

                        NO INFORMATION WAS AVAILABLE FOR THE FIRST QUARTER 1981.

 4/81  SYSTEM                                                                720

 5/81  SYSTEM                                                                744

 6/81  SYSTEM                                                                720
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ARIZONA PUBLIC SERVICE: FOUR CORNERS 1 (CONT.)

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE
PLANT NAME	FOUR CORNERS
UNIT NUMBER	2
CITY	FARMINGTON
STATE	NEW MEXICO
GROSS UNIT GENERATING CAPACITY - MW	175
NET UNIT GENERATING CAPACITY W/FGD - MW	175
EQUIVALENT SCRUBBED CAPACITY - MW	175

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	20004. (8600 BTU/LB)
AVERAGE ASH CONTENT - %	22.00
AVERAGE MOISTURE CONTENT - %	12.30
AVERAGE SULFUR CONTENT - %	.75
AVERAGE CHLORIDE CONTENT - %	.07

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME/ALKALINE FLYASH
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	11/79
CONTRACT AWARDED	**/**

*** SLUDGE

** TREATMENT

METHOD	NR

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THE FIRST QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 2 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ARIZONA PUBLIC SERVICE
PLANT NAME	FOUR CORNERS
UNIT NUMBER	3
CITY	FARMINGTON
STATE	NEW MEXICO
GROSS UNIT GENERATING CAPACITY - MW	229
NET UNIT GENERATING CAPACITY W/FGD - MW	229
EQUIVALENT SCRUBBED CAPACITY - MW	229
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	20004. (8600 BTU/LB)
AVERAGE ASH CONTENT - %	22.00
AVERAGE MOISTURE CONTENT - %	12.30
AVERAGE SULFUR CONTENT - %	.75
AVERAGE CHLORIDE CONTENT - %	.07
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIME/ALKALINE FLYASH
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	11/79
CONTRACT AWARDED	**/**
*** SLUDGE	
** TREATMENT	
METHOD	NR
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO INFORMATION WAS AVAILABLE FOR THE FIRST QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

ARIZONA PUBLIC SERVICE: FOUR CORNERS 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.										
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.										

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BASIN ELECTRIC POWER
PLANT NAME	LARAMIE RIVER
UNIT NUMBER	1
CITY	WHEATLAND
STATE	WYOMING
GROSS UNIT GENERATING CAPACITY - MW	570
NET UNIT GENERATING CAPACITY W/FGD - MW	550
EQUIVALENT SCRUBBED CAPACITY - MW	570

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	18931. (8139 BTU/LB)
AVERAGE ASH CONTENT - %	7.89
AVERAGE MOISTURE CONTENT - %	28.92
AVERAGE SULFUR CONTENT - %	.81
AVERAGE CHLORIDE CONTENT - %	.04

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.60
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	7/80
INITIAL START-UP DATE	7/80
CONTRACT AWARDED	1/77

*** SLUDGE

** TREATMENT

METHOD	FORCED OXIDATION

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	25.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	.0	.0		.0						
	B	100.0	91.3	100.0	88.6						
	C	100.0	97.4	100.0	94.5						
	D	100.0	95.8	100.0	93.0						
	E	100.0	95.7	100.0	92.8						
	SYSTEM	100.0	95.0	100.0	92.2			744	722	686	97.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULE A WAS UNAVAILABLE DUE TO MAINTENANCE ON WELDS IN THE QUENCHER SECTION THAT FAILED DUE TO CORROSION OF THE UDDEHOLM 904L.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	.0	.0		.0						
	B	100.0	94.0	100.0	84.2						
	C	100.0	97.7	100.0	87.5						
	D	100.0	97.8	100.0	87.6						

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	E	100.0	90.7	100.0	81.3						
	SYSTEM	100.0	95.1	100.0	85.1			672	602	572	81.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY MODULE A REMAINED OUT OF SERVICE DUE TO THE NECESSARY MAINTENANCE OF THE WELDS IN THE QUENCHER SECTION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	80.6	81.4	100.0	79.3						
	B	100.0	100.0	100.0	97.4						
	C	25.8	18.2	100.0	17.7						
	D	100.0	99.7	100.0	97.2						
	E	100.0	94.5	100.0	96.0						
	SYSTEM	100.0	99.4	100.0	96.9			744	725	721	96.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH MODULES A AND C EXPERIENCED OUTAGE TIME DUE TO MAINTENANCE ON THE WELDS IN THE QUENCHER SECTION RESULTING FROM CORROSION OF THE UDDEHOLM 904L.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	100.0	91.6	100.0	91.1						
	B	100.0	98.5	100.0	97.9						
	C	.0	.0		.0						
	D	100.0	99.9	100.0	99.3						
	E	100.0	99.4	100.0	98.9						
	SYSTEM	100.0	97.4	100.0	96.8			720	716	697	96.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL MODULE C WAS OUT OF SERVICE FOR MAINTENANCE ON THE WELDS IN THE QUENCHER SECTION DUE TO CORROSION OF THE UDDEHOLM 904L.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	A	106.0	86.7	100.0	78.2						
	B	100.0	98.0	100.0	88.4						
	C	.0	.0		.0						
	D	100.0	98.3	100.0	88.7						
	E	100.0	99.3	100.0	89.6						
	SYSTEM	100.0	95.6	100.0	86.3	92.00	99.70	744	671	642	85.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MODULE C WAS DOWN FOR MAINTENANCE ON WELDS ON THE QUENCHER SECTION DUE TO CORROSION OF THE UDDEHOLM 904L.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	A	100.0	51.5	100.0	50.6						
	B	100.0	98.8	100.0	97.1						
	C	100.0	89.8	100.0	88.3						
	D	70.0	67.8	100.0	66.7						
	E	30.0	27.3	100.0	26.8						
	SYSTEM	100.0	83.8	100.0	82.4			720	708	593	63.5

** PROBLEMS/SOLUTIONS/COMMENTS

D AND E MODULES WERE TAKEN OUT OF SERVICE FOR MAINTENANCE ON THE WELDS IN THE QUENCHER SECTION. THE UDDEHOLM 904L IS CORRODING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	100.0	95.5	100.0	95.5						
	B	100.0	99.0	100.0	99.0						
	C	100.0	90.6	100.0	90.6						
	D	100.0	96.6	100.0	96.6						
	E	.0	.0		.0						
	SYSTEM	100.0	95.4	100.0	95.4			744	744	710	86.9

BASIN ELECTRIC POWER: LARAMIE RIVER 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

E MODULE WAS TAKEN OUT OF SERVICE FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION. THE UDDEHOLM 904L IS CORRODING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	A	100.0	96.8	100.0	92.6						
	B	28.6	29.9	100.0	28.6						
	C	100.0	96.7	100.0	92.5						
	D	100.0	98.9	100.0	94.6						
	E	58.3	61.0	100.0	91.7						
	SYSTEM	96.7	95.8	100.0	91.7			744	711	682	83.7

** PROBLEMS/SOLUTIONS/COMMENTS

B AND E MODULES WERE TAKEN OUT OF SERVICE FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION. THE UDDEHOLM 904L IS CORRODING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	A	100.0	96.2	100.0	25.7						
	B	.0	.0		.0						
	C	100.0	91.3	100.0	24.4						
	D	100.0	92.4	100.0	24.7						
	E	100.0	94.0	100.0	25.1						
	SYSTEM	100.0	94.0	100.0	25.1			720	192	181	25.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE B MODULE WAS TAKEN OUT OF SERVICE FOR MAINTENANCE ON WELDS IN THE QUENCHER SECTION. THE UDDEHOLM 904L IS CORRODING.

THE UNIT WAS TAKEN OUT OF SERVICE FOR AN ANNUAL OVERHAUL.

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COMPANY NAME                                    BASIN ELECTRIC POWER
PLANT NAME                                      LARAMIE RIVER
UNIT NUMBER                                     2
CITY                                            WHEATLAND
STATE                                           WYOMING
REGULATORY CLASSIFICATION                       C
PARTICULATE EMISSION LIMITATION - NG/J             43.          (  .100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J                     86.          (  .200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J                  ******          (****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW               1500
GROSS UNIT GENERATING CAPACITY - MW               570
NET UNIT GENERATING CAPACITY W/FGD - MW           500
NET UNIT GENERATING CAPACITY WO/FGD - MW          495
EQUIVALENT SCRUBBED CAPACITY - MW                 570

 ** UNIT DATA - BOILER AND STACK
     BOILER SUPPLIER                            BABCOCK & WILCOX
     BOILER TYPE                                PULVERIZED COAL
     BOILER SERVICE LOAD                        BASE
     DESIGN BOILER FLUE GAS FLOW - CU.M/S        1321.32        (2800000 ACFM)
     BOILER FLUE GAS TEMPERATURE - C               56.1         ( 133 F)
     STACK HEIGHT - M                             183.          ( 600 FT)
     STACK SHELL                                CONCRETE
     STACK TOP DIAMETER - M                         8.7         ( 28.6 FT)

 ** FUEL DATA
     FUEL TYPE                                  COAL
     FUEL GRADE                                 SUBBITUMINOUS
     AVERAGE HEAT CONTENT - J/G                 18931.          (  8139 BTU/LB)
     RANGE HEAT CONTENT - BTU/LB                                 ******
     AVERAGE ASH CONTENT - %                        7.89
     RANGE ASH CONTENT - %                      ******
     AVERAGE MOISTURE CONTENT - %                  28.92
     RANGE MOISTURE CONTENT - %                 ******
     AVERAGE SULFUR CONTENT - %                       .81
     RANGE SULFUR CONTENT - %                   0.2-0.8
     AVERAGE CHLORIDE CONTENT - %                     .04
     RANGE CHLORIDE CONTENT - %                 ******

*** PARTICLE CONTROL

 ** ESP
     NUMBER                                       1
     TYPE                                       COLD SIDE
     SUPPLIER                                   BABCOCK & WILCOX
     INLET FLUE GAS CAPACITY - CU.M/S            1085.4         (2300000 ACFM)
     INLET FLUE GAS TEMPERATURE - C               141.1         (  286 F)
     PRESSURE DROP - KPA                             .8         (  3. IN-H2O)
     PARTICLE REMOVAL EFFICENCY - %                99.6

 ** PARTICLE SCRUBBER
     GENERIC TYPE                               NONE
     SPECIFIC TYPE                              N/A
     TRADE NAME/COMMON NAME                     N/A
     GAS CONTACTING DEVICE TYPE                 N/A

*** FGD SYSTEM

 ** GENERAL DATA
     SALEABLE PRODUCT/THROWAWAY PRODUCT         THROWAWAY PRODUCT
     SO2 REMOVAL MODE                           WET SCRUBBING
     PROCESS TYPE                               LIMESTONE
     SYSTEM SUPPLIER                            RESEARCH-COTTRELL
     A-E FIRM                                   BURNS & MCDONNELL
     DEVELOPMENT LEVEL                          FULL SCALE
     NEW/RETROFIT                               NEW
     UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %   99.60
     UNIT DESIGN SO2 REMOVAL EFFICIENCY - %        90.00
     CURRENT STATUS                               1
 EPA UTILITY FGD SURVEY: JULY - SEPTEMBER 1981

BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

     COMMERCIAL START-UP                          6/81
     INITIAL START-UP                             7/81
     CONTRACT AWARDED                             1/77

 ** DESIGN AND OPERATING PARAMETERS

 ** QUENCHER/PRESATURATOR
     CONSTRUCTION MATERIAL GENERIC TYPE          NR
     CONSTRUCTION MATERIAL SPECIFIC TYPE         NR

 ** ABSORBER
     NUMBER                                       5
     GENERIC TYPE                                COMBINATION
     SPECIFIC TYPE                               SPRAY/PACKED
     TRADE NAME/COMMON TYPE                      N/A
     SUPPLIER                                    RESEARCH-COTTRELL
     DIMENSIONS - FT                             30.0 X 30.0 X 88.0
     SHELL GENERIC MATERIAL                      STAINLESS STEEL, HIGH ALLOY
     SHELL SPECIFIC MATERIAL                     AUSTENITIC, IRON BASE/NICKEL-CHROMIUM-COPPER-MOL
     SHELL MATERIAL TRADE NAME/COMMON TYPE       TYPE 316L, ALLOY 904L
     LINER GENERIC MATERIAL                      NONE
     LINER SPECIFIC MATERIAL                     N/A
     LINER MATERIAL TRADE NAME/COMMON TYPE       N/A
     GAS CONTACTING DEVICE TYPE                  VERTICAL CROSS CHANNEL FIXED GRID PACKING
     NUMBER OF CONTACTING ZONES                   2
     DISTANCE BETWEEN GAS CONTACTING ZONES - CM     61.0         (    24.0IN)
     L/G RATIO - L/CU.M                              8.0         ( 60.0 GAL/1000 ACF)
     SUPERFICAL GAS VELOCITY - M/SEC                 3.0         ( 10.0 FT/S)
     INLET GAS FLOW - CU. M/S                     1085.37        (2300000 ACFM)
     INLET GAS TEMPERATURE - C                     141.1         (   286 F)
     SO2 REMOVAL EFFICIENCY - %                     90.0
     PARTICLE REMOVAL EFFICENCY - %                   .0

 ** MIST ELIMINATOR
     PRE-MIST ELIMINATOR/MIST ELIMINATOR         PRIMARY COLLECTOR
     GENERIC TYPE                                IMPINGEMENT
     SPECIFIC TYPE                               BAFFLE
     TRADE NAME/COMMON TYPE                      CLOSED VANE
     CONFIGURATION                               VERTICAL
     NUMBER OF STAGES                                1
     NUMBER OF PASSES PER STAGE                      1
     CONSTRUCTION MATERIAL GENERIC TYPE          NR
     CONSTRUCTION MATERIAL SPECIFIC TYPE         NR

 ** REHEATER
     GENERIC TYPE                                NONE
     SPECIFIC TYPE                               N/A
     TRADE NAME/COMMON TYPE                      N/A
     CONSTRUCTION MATERIAL GENERIC TYPE          NONE
     CONSTRUCTION MATERIAL SPECIFIC TYPE         N/A

 ** FANS
     NUMBER                                       2
     DESIGN                                      CENTRIFUGAL
     FUNCTION                                    UNIT
     APPLICATION                                 FORCED DRAFT
     SERVICE                                     DRY
     CONSTRUCTION MATERIAL GENERIC TYPE          CARBON STEEL

 ** DAMPERS
     FUNCTION                                    NR
     GENERIC TYPE                                NR
     SPECIFIC TYPE                               NR
     CONSTRUCTION MATERIAL GENERIC TYPE          NR
     CONSTRUCTION MATERIAL SPECIFIC TYPE         NR
     LINER GENERIC MATERIAL TYPE                 NR
     LINER SPECIFIC MATERIAL TYPE                NR

 ** DUCTWORK
      SHELL GENERIC MATERIAL TYPE                NR
      SHELL SPECIFIC MATERIAL TYPE               NR
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BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

      LINER GENERIC MATERIAL TYPE             NR
      LINER SPECIFIC MATERIAL TYPE            NR

  ** REAGENT PREPARATION EQUIPMENT
     FUNCTION                                 WET BALL MILL
     DEVICE                                   COMPARTMENTED
     DEVICE TYPE                              NR
     NUMBER                                     2
     FULL LOAD DRY FEED CAPACITY - M.TONS/HR       13.6        (  15 TPH)
     PRODUCT QUALITY - % SOLIDS                    30.0

  ** SOLIDS CONCENTRATING/DEWATERING
     DEVICE                                   THICKENER
     NUMBER                                     3
     NUMBER OF SPARES                         1
     DIMENSIONS - FT                          110.0 DIA X 10.0
     SHELL GENERIC MATERIAL TYPE              CONCRETE

  ** SOLIDS CONCENTRATING/DEWATERING
     DEVICE                                   CENTRIFUGE
     NUMBER                                     1
     NUMBER OF SPARES                         0
     FEED STREAM CHARACTERISTICS              35% SOLIDS
     OUTLET STREAM CHARACTERISTICS            60% SOLIDS

 *** SALEABLE BYPRODUCTS
     DISPOSITION                              LANDFILL

 *** SLUDGE

  ** TREATMENT
     METHOD                                   FORCED OXIDATION
     DEVICE                                   OXIDATION TANK
     PROPRIETARY PROCESS                      N/A

  ** DISPOSAL
     NATURE                                   FINAL
     TYPE                                     LANDFILL
     LOCATION                                 ON-SITE
     SITE TRANSPORTATION METHOD               CONVEYOR BELT
     SITE TREATMENT                           NONE
     SITE SERVICE LIFE - YRS                    35

  ** PROCESS CONTROL AND INSTRUMENTATION
     CHEMICAL PARAMETERS                      PH, SOLIDS, SO2 INLET, ACFM, SO2 OUTLET
     PROCESS CONTROL MANNER                   AUTOMATIC

  ** WATER BALANCE
     WATER LOOP TYPE                          CLOSED
     MAKEUP WATER ADDITION - LITERS/S            16.9        (  269 GPM)


------------- ---------------------------------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 7/81  SYSTEM                                                                744

       ** PROBLEMS/SOLUTIONS/COMMENTS

                         INITIAL OPERATION OF THE FGD SYSTEM BEGAN DURING JULY 1981.

 8/81  A           100.0         78.2       100.0        77.6
       B            52.4         52.8       100.0        52.4
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BASIN ELECTRIC POWER: LARAMIE RIVER 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	100.0	82.3	100.0	81.7						
	D	31.9	32.2	100.0	31.9						
	E	100.0	28.8	100.0	28.6						
	SYSTEM	96.1	68.6	100.0	68.1			744	738	506	46.7

** PROBLEMS/SOLUTIONS/COMMENTS

B AND D MODULES WERE OUT OF SERVICE SO THAT BRACING WORK ON ROUND-OFF CORNERS COULD BE PERFORMED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	A	100.0	94.0	100.0	77.4						
	B	100.0	99.0	100.0	81.5						
	C	37.7	31.2	100.0	25.7						
	D	100.0	41.7	100.0	34.3						
	E	100.0	60.4	100.0	49.7						
	SYSTEM	100.0	81.6	100.0	67.2			720	593	483	55.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED NO PROBLEMS WITH THE FGD SYSTEM WERE ENCOUNTERED IN THE MONTH OF SEPTEMBER.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	BIG RIVERS ELECTRIC	
PLANT NAME	GREEN	
UNIT NUMBER	1	
CITY	SEBREE	
STATE	KENTUCKY	
GROSS UNIT GENERATING CAPACITY - MW	242	
NET UNIT GENERATING CAPACITY W/FGD - MW	200	
EQUIVALENT SCRUBBED CAPACITY - MW	242	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	22678.	(9750 BTU/LB)
AVERAGE ASH CONTENT - %	20.00	
AVERAGE MOISTURE CONTENT - %	11.00	
AVERAGE SULFUR CONTENT - %	3.75	
AVERAGE CHLORIDE CONTENT - %	.05	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	AMERICAN AIR FILTER	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00	
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	*******	
COMMERIAL START-UP DATE	12/79	
INITIAL START-UP DATE	12/79	
CONTRACT AWARDED	10/76	
*** SLUDGE		
** TREATMENT		
METHOD	FIXATION	
** DISPOSAL		
TYPE	LANDFILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	30.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.4	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/80	SYSTEM				40.7			720		293	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER THE VENDOR INSTALLED NEW SWITCHES ON BOTH MODULES' TRAVELING SCREENS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/80	SYSTEM	80.4			40.9			744		304	

** PROBLEMS/SOLUTIONS/COMMENTS

ON SEPTEMBER 12 THE FGD SYSTEM WAS TAKEN OFF-LINE FOR A SCHEDULED OUTAGE. THE SYSTEM WAS PLACED BACK IN SERVICE ON OCTOBER 13.

DURING OCTOBER A CONTROL SYSTEM MALFUNCTION CAUSED APPROXIMATELY 2 1/2 DAYS OF OUTAGE TIME.

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-------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                               SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------
                                   DUE TO LOST LEVEL IN ADDITIVE HOLD TANK THE SCREW CONVEYOR TRIPPED OUT.

                                   THE THICKENER WAS CLEANED OUT AND THE LEAKS REPAIRED DURING THE MONTH.

                                   LEAKS WERE ENCOUNTERED ON THE EXPANSION JOINTS LOCATED ON THE ABSORBER
                                   OUTLET DUCT.  THESE EXPANSION JOINTS WERE REPLACED DURING THE MONTH.

11/80  SYSTEM      97.5                                     96.0               720          691

       ** PROBLEMS/SOLUTIONS/COMMENTS

                                   A LEAK IN MODULE A BLEED LINE DURING NOVEMBER CAUSED APPROXIMATELY 10
                                   HOURS OF OUTAGE TIME.

12/80  SYSTEM      97.9                                     93.5               744          695

       ** PROBLEMS/SOLUTIONS/COMMENTS

                                   DURING DECEMBER SEVEN HOURS OF DOWN TIME WAS DUE TO PROBLEMS AT THE SOLID
                                   WASTE FACILITY.

                                   LEAKS WERE ENCOUNTERED WITH THE MIST ELIMINATOR WASH LINES.

                                   PROBLEMS WERE ENCOUNTERED WITH THE CLARIFIERS AT THE COOLING TOWER CAUSING
                                   THE FGD SYSTEM TO BE TAKEN OUT OF SERVICE FOR APPROXIMATELY 23 HOURS.

 1/81  SYSTEM      88.4                                     82.9               744          617

       ** PROBLEMS/SOLUTIONS/COMMENTS

                                   DURING THE FIRST PART OF JANUARY THE UTILITY EXPERIENCED PROBLEMS WITH
                                   HAULING THE WASTE PRODUCT.  THIS CAUSED THE SYSTEM TO BE TAKEN OFF LINE
                                   APPROXIMATELY THREE DAYS.

                                   DURING THE MONTH IT WAS NECESSARY TO WASH THE ID FAN.

                                   PROBLEMS WERE ENCOUNTERED WITH THE RECYCLE PUMP PACKING.

 2/81  SYSTEM      90.9                                     84.9               696          591

       ** PROBLEMS/SOLUTIONS/COMMENTS

                                   THE UTILITY HAS EXPERIENCED BYPASS DAMPER PROBLEMS AND IN FEBRUARY INSTALL-
                                   ED A SOLENOID ON THE DAMPER TO RESOLVE THE PROBLEM.

                                   REPAIR WORK ON THE MIST ELIMINATOR LEAKS WAS PERFORMED DURING THE MONTH.

                                   THICKENER MAINTENANCE CAUSED AN OUTAGE WHICH LASTED 22 HOURS.

                                   THE ADDITIVE FEED LINE TO MODULE A REACTION TANK PLUGGED.

 3/81  SYSTEM     100.0                                     51.4               744          382

       ** PROBLEMS/SOLUTIONS/COMMENTS

                                   THE SYSTEM WAS SHUT DOWN DURING THE FIRST TWO WEEKS OF MARCH FOR SCHEDULED
                                   MAINTENANCE.

 4/81  SYSTEM     100.0                                     60.7               720          437
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BIG RIVERS ELECTRIC: GREEN 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	SYSTEM	84.7			79.3			744		590	

** PROBLEMS/SOLUTIONS/COMMENTS

AT THE FIRST OF MAY GENERAL MAINTENANCE WAS PERFORMED ON THE SYSTEM.

PLUGGING WAS EXPERIENCED IN THE LINES ASSOCIATED WITH THE SLAKER.

THICKENER MAINTENANCE CAUSED THE SYSTEM TO BE OFF-LINE APPROXIMATELY 15 HOURS.

TWO OUTAGES WERE CAUSED BY THE THICKENER RAKE.

A LINE LEAK IN THE MIST ELIMINATOR WASH TANK WAS ENCOUNTERED. FIVE HOURS OF OUTAGE TIME WAS NEEDED TO MAKE THE NECESSARY REPAIRS.

PLUGGED ADDITIVE LINES CAUSED TWO OUTAGES DURING THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM	95.1			95.1			720		684	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE THE ADDITIVE LINES TO BOTH MODULES PLUGGED CAUSING THE SYSTEM TO SHUT DOWN THREE SEPARATE TIMES.

THE BYPASS DAMPER SOLENOID MALFUNCTIONED AND HAD TO BE REPLACED.

PROBLEMS HAVE BEEN ENCOUNTERED WITH THE MODULE B INLET DAMPER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	98.3	96.2	96.2	96.2						
	B	98.3	96.2	96.2	96.2						
	SYSTEM	98.3	96.2	96.2	96.2			744	744	716	93.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE MAJORITY OF THE OUTAGE TIME DURING THE MONTH RESULTED FROM PLUGGING OF THE ADDITIVE FEED LINES AND CONTROL VALVES, AS WELL AS MECHANICAL PROBLEMS WITH THE LIMIT SWITCHES ON THE DAMPERS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	A	95.2	92.6	92.6	85.3						
	B	95.2	92.6	92.6	85.3						
	SYSTEM	95.2	92.6	92.6	85.3			744	686	635	88.9
9/81	A	84.5	96.4	96.4	79.9						
	B	84.5	96.4	96.4	79.9						
	SYSTEM	84.5	96.4	96.4	79.9			720	597	575	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER, THE FGD SYSTEM AVAILABILITY WAS SLIGHTLY LIMITED DUE TO THE REPLACEMENT OF THE CHEVRON MIST ELIMINATORS ON BOTH MODULES.

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                                    SECTION 3
            DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS
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 COMPANY NAME                                 BIG RIVERS ELECTRIC
 PLANT NAME                                   GREEN
 UNIT NUMBER                                  2
 CITY                                         SEBREE
 STATE                                        KENTUCKY
 GROSS UNIT GENERATING CAPACITY - MW            242
 NET UNIT GENERATING CAPACITY W/FGD - MW        200
 EQUIVALENT SCRUBBED CAPACITY - MW              242

 ** FUEL DATA
     FUEL TYPE                                COAL
     FUEL GRADE                               BITUMINOUS
     AVERAGE HEAT CONTENT - J/G                22678.        (  9750 BTU/LB)
     AVERAGE ASH CONTENT - %                     20.00
     AVERAGE MOISTURE CONTENT - %                11.00
     AVERAGE SULFUR CONTENT - %                   3.75
     AVERAGE CHLORIDE CONTENT - %                  .05

*** FGD SYSTEM

 ** GENERAL DATA
     PROCESS TYPE                             LIME
     SYSTEM SUPPLIER                          AMERICAN AIR FILTER
     NEW/RETROFIT                             NEW
     PARTICULATE DESIGN REMOVAL EFFICIENCY - %   99.00
     SO2 DESIGN REMOVAL EFFICIENCY - %           90.00
     ENERGY CONSUMPTION - %                   *******
     COMMERIAL START-UP DATE                  12/80
     INITIAL START-UP DATE                    11/80
     CONTRACT AWARDED                          5/77

*** SLUDGE

 ** TREATMENT
     METHOD                                   FIXATION

 ** DISPOSAL
     TYPE                                     LANDFILL


--------------------------------------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

11/80  SYSTEM      94.2                            91.8                     720          661

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        ON NOVEMBER 14, 1980 OPERATION OF UNIT 2 COMMENCED.

                        DURING THE MONTH TWO OUTAGES WERE CAUSED BY THICKENER RAKE PROBLEMS.

                        THE ADDITIVE FEED LINE PLUGGED CAUSING ABOUT EIGHT HOURS OF DOWN TIME.

                        DURING OPERATION ON LOW RECYCLE FLOW, A WELD ON THE BYPASS DAMPER
                        ADJUSTMENT ARM ROD FAILED.

12/80  SYSTEM      96.2                            26.1                     744          194

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        THE BOILER WAS DOWN FOR 18 DAYS AT THE BEGINNING OF DECEMBER.

                        PROBLEMS WITH THE BYPASS DAMPER WAS ENCOUNTERED DURING THE MONTH.

 1/81  SYSTEM      94.3                            68.1                     744          506
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BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE DAMPERS MALFUNCTIONED ON MODULE B, WHEN THE RECYCLE PUMP TRIPPED, CAUSING ABOUT SEVEN HOURS OF OUTAGE TIME.

THE UTILITY IS EXPERIENCING PROBLEMS WITH HAULING THE WASTE PRODUCT.

THE MODULE B REACTION TANK HAS EXPERIENCED PLUGGING DUE TO THE INABILITY TO MAINTAIN THE PH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	94.5			94.0			696		654	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THICKENER MAINTENANCE WAS PERFORMED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	97.9			97.9			744		728	
4/81	SYSTEM	99.9			99.5			720		716	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH AND APRIL.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	SYSTEM	92.7			92.0			744		684	

** PROBLEMS/SOLUTIONS/COMMENTS

THE ADDITIVE LINE TO THE REACTION TANK PLUGGED CAUSING OUTAGE TIME DURING MAY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM	96.2			95.6			720		688	

** PROBLEMS/SOLUTIONS/COMMENTS

THE MODULE A DISCHARGE LINE SEPARATED DURING THE MONTH CAUSING A 10 HOUR OUTAGE.

PROBLEMS WERE ENCOUNTERED WITH THE INLET PRESSURE SWITCH ON BOTH MODULES. THE SWITCHES FOULED APPROXIMATELY SIX TIMES DURING JUNE CAUSING A TOTAL OF 14 HOURS OF OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	94.0	89.1	89.1	77.2						
	B	94.0	89.1	89.1	77.2						
	SYSTEM	94.0	89.1	89.1	77.2			744	645	574	77.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, PLUGGING OF THE ADDITIVE FEED LINES AND CONTROL VALVES, AS WELL AS MECHANICAL PROBLEMS WITH THE LIMIT SWITCHES ON THE DAMPERS CONTRIBUTED TO THE MAJORITY OF THE OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	A	96.4	94.0	94.0	86.0						
	B	97.8	94.0	94.0	86.0						
	SYSTEM	97.1	94.0	94.0	86.0			744	681	640	85.1
9/81	A	99.7	98.5	98.5	98.4						
	B	99.7	98.5	98.5	98.4						
	SYSTEM	99.7	98.5	98.5	98.4			720	719	708	84.7

BIG RIVERS ELECTRIC: GREEN 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD RELATED PROBLEMS WERE REPORTED FOR THE MONTHS OF AUGUST AND SEPTEMBER.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	CENTRAL ILLINOIS LIGHT
PLANT NAME	DUCK CREEK
UNIT NUMBER	1
CITY	CANTON
STATE	ILLINOIS
GROSS UNIT GENERATING CAPACITY - MW	416
NET UNIT GENERATING CAPACITY W/FGD - MW	378
EQUIVALENT SCRUBBED CAPACITY - MW	416
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	24181. (10396 BTU/LB)
AVERAGE ASH CONTENT - %	9.77
AVERAGE MOISTURE CONTENT - %	15.43
AVERAGE SULFUR CONTENT - %	3.66
AVERAGE CHLORIDE CONTENT - %	.06
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	ENVIRONEERING, RILEY STOKER
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	********
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00
ENERGY CONSUMPTION - %	2.9
COMMERIAL START-UP DATE	8/78
INITIAL START-UP DATE	7/76
CONTRACT AWARDED	8/73
*** SLUDGE	
** TREATMENT	
METHOD	BLEED
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	92.2	92.1	94.9	92.1						
	B	94.9	94.9	97.8	94.8						
	C	94.2	94.1	98.0	94.1						
	D	88.6	88.6	94.4	88.6						
	SYSTEM	92.5	92.4	96.3	92.4			744	744	687	77.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY SOME OUTAGE TIME WAS DUE TO THE PLUGGING OF THE RECYCLE TANK PUMP SUCTION SCREENS.

REPAIRS WERE MADE TO THE INLET DAMPER OF MODULE C AND THE RECYCLE TANK PUMP OF MODULE D DURING THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	95.2	95.8	100.0	94.2						
	B	80.2	81.5	96.9	80.2						

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	C	95.1	95.6	100.0	94.0						
	D	94.0	94.6	99.8	93.0						
	SYSTEM	91.1	91.8	99.2	90.3			672	661	607	59.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY PROBLEMS WERE ENCOUNTERED THAT NECESSITATED REPAIRS TO THE LIMESTONE CONVEYOR BELT AND THE SLURRY SUPPLY TANK AND LINES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	93.8	88.5	91.6	85.1						
	B	82.5	79.9	84.7	76.9						
	C	84.7	81.5	85.5	78.4						
	D	86.8	84.1	90.8	80.8						
	SYSTEM	86.9	83.5	88.2	80.2			744	715	597	68.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH OUTAGE TIME WAS DUE TO THE REPLACEMENT OF THE LIMESTONE MILL HIGH LIFT PUMP AND THE SLURRY STORAGE TANK PUMP, BOTH LIMITING THE LIMESTONE SLURRY SUPPLY. THE RECYCLE TANK PUMP ON MODULE C WAS ALSO REPLACED.

ADDITIONAL OUTAGE TIME WAS CAUSED BY PLUGGING IN THE MIST ELIMINATOR SECTION OF ALL THE MODULES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	26.2	27.1	28.1	23.3						
	B	27.1	28.1	29.5	24.2						
	C	44.8	29.1	30.2	25.0						
	D	52.1	28.4	29.5	24.4						
	SYSTEM	37.5	28.1	29.2	24.2			720	619	174	58.6

** PROBLEMS/SOLUTIONS/COMMENTS

EXTENSIVE PLUGGING THROUGHOUT EACH MODULE WAS OBSERVED AT THE BEGINNING OF APRIL, RESULTING IN THE NEED FOR EXTENSIVE MAINTENANCE CLEANING, REPAIRS, AND UPGRADING OF EACH MODULE. THE MODULES WERE TAKEN OUT OF SERVICE TWO AT A TIME SO THAT THE WORK COULD BE PERFORMED.

THE ISOLATION DAMPERS ON ALL FOUR MODULES HAVE BEEN A CONTINUAL PROBLEM. THE DAMPERS STICK AND FAIL TO SEAL TIGHTLY RESULTING IN GASEOUS CONDITIONS FOR MAINTENANCE CREWS. THE UTILITY IS PRESENTLY INVESTIGATING THE SITUATION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	A	68.7	67.0	69.1	65.9						
	B	68.1	66.4	69.2	65.3						
	C	76.4	69.9	71.4	68.7						
	D	71.4	69.8	73.4	68.5						
	SYSTEM	69.9	68.3	70.8	67.1			744	731	499	64.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MAJOR REPAIR TO THE MODULE C FAN RESULTED IN LOW SYSTEM AVAILABILITY DUE TO THE NEED FOR BYPASSING AROUND THE MODULE. PROBLEMS WITH OPERATION OF THE MODULE C ISOLATION DAMPER AS WELL AS EXPANSION JOINT LEAKAGE, RESULTED IN GASEOUS WORKING CONDITIONS SUCH THAT REPAIR WORK COULD NOT BE PERFORMED WITH THE SCRUBBER IN SERVICE.

PROBLEMS PERSIST WITH ALL THE ISOLATION DAMPERS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	1	69.9	60.0	67.4	51.5						
	B	71.3	63.9	71.2	54.8						
	C	72.4	65.2	70.5	55.9						
	D	70.3	61.6	69.5	52.9						
	SYSTEM	71.0	62.7	69.6	53.8			720	618	387	52.8

CENTRAL ILLINOIS LIGHT: DUCK CREEK 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE WORK ON THE MODULE C ID FAN CONTINUED. DUE TO THE CONTINUAL DAMPER PROBLEMS THE MODULE WAS TAKEN OUT OF SERVICE SO THAT THE REPAIRS COULD BE COMPLETED.

7/81	A	78.2	62.4	73.0	53.4						
	B	75.8	62.3	75.7	53.2						
	C	80.5	64.2	75.1	54.8						
	D	53.6	62.7	75.1	53.6						
	SYSTEM	72.0	62.9	74.7	53.8			744	636	400	56.4

** PROBLEMS/SOLUTIONS/COMMENTS

PROBLEMS WITH OPERATION OF THE ISOLATION DAMPERS AND EXPANSION JOINT LEAKAGE DURING THE MONTH RESULTED IN LOW SYSTEM AVAILABILITY DUE TO THE NEED FOR BYPASSING FLUE GAS TO ELIMINATE GASEOUS WORKING CONDITIONS DURING MAINTENANCE OPERATIONS.

SIGNIFICANT REPAIR WORK WAS REQUIRED DURING THE MONTH ON THE MODULE A,B, AND D RECYCLE PUMPS.

8/81	A	79.4	78.6	80.0	78.6						
	B	79.7	78.9	79.6	78.9						
	C	79.6	78.9	80.3	78.9						
	D	60.3	60.3	62.6	60.3						
	SYSTEM	74.8	74.2	75.6	74.2			744	744	552	75.0

** PROBLEMS/SOLUTIONS/COMMENTS

ISOLATION DAMPER AND EXPANSION JOINT PROBLEMS CONTINUED TO LOWER THE OVERALL FGD SYSTEM AVAILABILITY.

MIXER REPAIR ON THE MODULE D RECYCLE TANK RESULTED IN LOW MODULE AVAILABILITY.

9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTH OF SEPTEMBER WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	CENTRAL ILLINOIS PUBLIC SERV
PLANT NAME	NEWTON
UNIT NUMBER	1
CITY	NEWTON
STATE	ILLINOIS
GROSS UNIT GENERATING CAPACITY - MW	617
NET UNIT GENERATING CAPACITY W/FGD - MW	575
EQUIVALENT SCRUBBED CAPACITY - MW	617

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25353.	(10900 BTU/LB)
AVERAGE ASH CONTENT - %	12.70	
AVERAGE MOISTURE CONTENT - %	9.50	
AVERAGE SULFUR CONTENT - %	2.25	
AVERAGE CHLORIDE CONTENT - %	.20	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	DUAL ALKALI
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	2.4
COMMERIAL START-UP DATE	12/79
INITIAL START-UP DATE	9/79
CONTRACT AWARDED	8/75

*** SLUDGE

** TREATMENT

METHOD	FIXATION

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	33.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

--PERFORMANCE DATA--

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	90.5	75.0	99.1	75.0						
	B	73.9	58.1	99.5	58.1						
	C	96.2	79.8	100.0	79.8						
	D	88.3	57.1	100.0	57.1						
	SYSTEM	99.1	89.5	100.0	89.5			744	744	425	71.4
2/81	A	93.2	49.8	100.0	49.7						
	B	96.0	81.1	100.0	81.0						
	C	92.3	72.3	100.0	72.2						
	D	100.0	82.4	100.0	82.3						
	SYSTEM	100.0	95.1	100.0	94.9			672	671	639	66.6
3/81	A	94.1	56.9	100.0	52.7						
	B	87.1	80.6	100.0	75.0						
	C	86.4	65.9	100.0	61.0						
	D	94.1	65.5	100.0	60.6						
	SYSTEM	90.4	67.2	100.0	62.2			744	689	463	63.3

CENTRAL ILLINOIS PUBLIC SERV: NEWTON 1 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	96.1	73.3	100.0	73.3						
	B	98.2	82.8	100.0	82.8						
	C	96.7	60.6	100.0	60.6						
	D	98.5	85.1	100.0	85.1						
	SYSTEM	99.9	94.5	100.0	94.5			720	720	680	73.2

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING APRIL.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	A	93.3	66.9	98.3	61.4						
	B	85.3	78.0	98.5	71.6						
	C	91.9	76.6	98.5	70.3						
	D	93.4	43.2	97.4	39.7						
	SYSTEM	100.0	88.3	98.4	81.0			744	683	603	60.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MAY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	A	96.5	64.9	100.0	64.6						
	B	92.2	72.1	100.0	71.7						
	C	88.3	46.4	100.0	46.1						
	D	96.7	92.2	100.0	91.7						
	SYSTEM	100.0	91.9	100.0	91.3			720	716	658	64.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	79.6	44.5	79.2	42.9						
	B	85.3	64.6	84.8	62.2						
	C	84.5	35.0	74.3	33.7						
	D	82.5	68.2	84.9	65.7						
	SYSTEM	89.2	70.2	98.9	67.6			744	717	503	55.4
8/81	A	92.7	55.6	100.0	55.6						
	B	90.5	64.5	100.0	64.5						
	C	100.0	67.1	100.0	67.1						
	D	81.3	57.0	100.0	57.0						
	SYSTEM	100.0	81.6	100.0	81.6			744	744	607	57.9
9/81	A	88.8	45.3	100.0	38.9						
	B	99.0	78.4	100.0	67.4						
	C	100.0	79.5	100.0	68.3						
	D	97.9	38.8	100.0	33.3						
	SYSTEM	100.0	80.7	100.0	69.3			720	619	499	47.2

** PROBLEMS/SOLUTIONS/COMMENTS

A SCHEDULED MAINTENANCE OUTAGE (BOTH BOILER AND FGD SYSTEM) BEGAN ON SEPTEMBER 26.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

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COMPANY NAME                                          CINCINNATI GAS & ELECTRIC
PLANT NAME                                            EAST BEND
UNIT NUMBER                                           2
CITY                                                  RABBITHASH
STATE                                                 KENTUCKY
REGULATORY CLASSIFICATION                             B
PARTICULATE EMISSION LIMITATION - NG/J                  43.        (  .100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J                         516.        ( 1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J                         301.        (  .700 LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW                     650
GROSS UNIT GENERATING CAPACITY - MW                    650
NET UNIT GENERATING CAPACITY W/FGD - MW                600
NET UNIT GENERATING CAPACITY W/O/FGD - MW              619
EQUIVALENT SCRUBBED CAPACITY - MW                      650

 ** UNIT DATA - BOILER AND STACK
     BOILER SUPPLIER                                  BABCOCK & WILCOX
     BOILER TYPE                                      PULVERIZED COAL
     BOILER SERVICE LOAD                              BASE
     DESIGN BOILER FLUE GAS FLOW - CU.M/S              1763.96       (3738000 ACFM)
     BOILER FLUE GAS TEMPERATURE - C                     358.3       ( 677 F)
     STACK HEIGHT - M                                    198.        ( 650 FT)
     STACK SHELL                                      ******
     STACK TOP DIAMETER - M                                3.7       ( 12.0 FT)

 ** FUEL DATA
     FUEL TYPE                                        COAL
     FUEL GRADE                                       ******
     AVERAGE HEAT CONTENT - J/G                       25586.         ( 11000 BTU/LB)
     RANGE HEAT CONTENT - BTU/LB                                       10800-13000
     AVERAGE ASH CONTENT - %                             11.90
     RANGE ASH CONTENT - %                            ******
     AVERAGE MOISTURE CONTENT - %                        10.00
     RANGE MOISTURE CONTENT - %                       ******
     AVERAGE SULFUR CONTENT - %                           3.00
     RANGE SULFUR CONTENT - %                         3.0-5.0
     AVERAGE CHLORIDE CONTENT - %                     ********
     RANGE CHLORIDE CONTENT - %                       ******

*** PARTICLE CONTROL

 ** ESP
     NUMBER                                            1
     TYPE                                             HOT SIDE
     SUPPLIER                                         WESTERN PREC. DIVISION, JOY
     INLET FLUE GAS CAPACITY - CU.M/S                  1764.0        (3738000 ACFM)
     INLET FLUE GAS TEMPERATURE - C                     136.7        (   278 F)
     PRESSURE DROP - KPA                                   .1        (   1. IN-H2O)
     PARTICLE REMOVAL EFFICENCY - %                      99.7

 ** PARTICLE SCRUBBER
     GENERIC TYPE                                     NONE
     SPECIFIC TYPE                                    N/A
     TRADE NAME/COMMON NAME                           N/A

*** FGD SYSTEM

 ** GENERAL DATA
     SALEABLE PRODUCT/THROWAWAY PRODUCT               THROWAWAY PRODUCT
     SO2 REMOVAL MODE                                 WET SCRUBBING
     PROCESS TYPE                                     LIME
     SYSTEM SUPPLIER                                  BABCOCK & WILCOX
     A-E FIRM                                         SARGENT & LUNDY
     DEVELOPMENT LEVEL                                FULL SCALE
     NEW/RETROFIT                                     NEW
     UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %        99.00
     UNIT DESIGN SO2 REMOVAL EFFICIENCY - %             87.00
     ENERGY CONSUMPTION - %                              2.9
     CURRENT STATUS                                   1
```

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

COMMERCIAL START-UP	3/81	
INITIAL START-UP	3/81	
CONTRACT AWARDED	12/77	

** DESIGN AND OPERATING PARAMETERS

SPACE REQUIREMENTS - SQ M	13461.2	(144900 SQ FT)

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	BABCOCK & WILCOX	
DIMENSIONS - FT	43.0 DIA X 95.0	
SHELL GENERIC MATERIAL	STAINLESS STEEL	
SHELL SPECIFIC MATERIAL	AUSTENITIC	
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR	
LINER GENERIC MATERIAL	INORGANIC	
LINER SPECIFIC MATERIAL	PREFIRED BRICK/SHAPES	
LINER MATERIAL TRADE NAME/COMMON TYPE	ACID-RESISTANT BRICK [LOW H2O ABSORPTION]	
GAS CONTACTING DEVICE TYPE	PERFORATED TRAYS	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	6615.	(***** GPM)
L/G RATIO - L/CU.M	6.7	(50.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	1.0	(4.0 IN-H2O)
INLET GAS FLOW - CU. M/S	1196.74	(2536000 ACFM)
INLET GAS TEMPERATURE - C	136.7	(278 F)
SO2 REMOVAL EFFICIENCY - %	87.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONFIGURATION	HORIZONTAL	
NUMBER OF STAGES	2	
FREEBOARD DISTANCE - M	2.13	(7.0 FT)
PRESSURE DROP - KPA	.1	(.5 IN-H2O)
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC	
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER	
WASH FREQUENCY	INTERMITTENT	

** REHEATER

GENERIC TYPE	INDIRECT HOT AIR	
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER	
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE	
TEMPERATURE INCREASE - C	13.9	(25 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

DESIGN	CENTRIFUGAL
SUPPLIER	WESTINGHOUSE
FUNCTION	BOOSTER
APPLICATION	INDUCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** FANS

DESIGN	CENTRIFUGAL
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR

```
CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

     SPECIFIC TYPE                              NR
     CONSTRUCTION MATERIAL GENERIC TYPE         NR
     CONSTRUCTION MATERIAL SPECIFIC TYPE        NR
     LINER GENERIC MATERIAL TYPE                NR
     LINER SPECIFIC MATERIAL TYPE               NR

 ** DUCTWORK
      SHELL GENERIC MATERIAL TYPE               NR
      SHELL SPECIFIC MATERIAL TYPE              NR
      LINER GENERIC MATERIAL TYPE               NR
      LINER SPECIFIC MATERIAL TYPE              NR

 ** REAGENT PREPARATION EQUIPMENT
     FUNCTION                                   SLAKER
     DEVICE                                     NR
     DEVICE TYPE                                NR
     MANUFACTURER                               WALLACE & TIERNAN
     NUMBER                                      8
     FULL LOAD DRY FEED CAPACITY - M.TONS/HR        2.7        (    3 TPH)

 ** TANKS
     SERVICE                                    NUMBER
     -------                                    ------
     ABSORBER RECYCLE                           ****
     SLURRY FEED                                   1
     CLARIFIED WATER RECIRCULATION                 1
     THICKENER UNDERFLOW SURGE                     1

 ** PUMPS
     SERVICE                                    NUMBER
     -------                                    ------
     FEED SLURRY                                   2
     ABSORBER RECIRCULATION                       12
     QUENCHER RECIRCULATION                        6
     THICKENER UNDERFLOW                           4
     CLARIFIED RECYCLE                             2

 ** SOLIDS CONCENTRATING/DEWATERING
     DEVICE                                     VACUUM FILTER
     NUMBER                                      4
     SHELL GENERIC MATERIAL TYPE                CARBON STEEL
     LINER GENERIC MATERIAL TYPE                ORGANIC
     LINER SPECIFIC MATERIAL TYPE               POLYPROPYLENE
     OUTLET STREAM CHARACTERISTICS              47.5% SOLIDS

 ** SOLIDS CONCENTRATING/DEWATERING
     DEVICE                                     THICKENER
     NUMBER                                      2
     DIMENSIONS - FT                            190.0 DIA X 25.0
     SHELL GENERIC MATERIAL TYPE                CONCRETE
     LINER GENERIC MATERIAL TYPE                CARBON STEEL

*** SLUDGE

 ** TREATMENT
     METHOD                                     FIXATION
     DEVICE                                     PUG MILL
     PROPRIETARY PROCESS                        IUCS
     INLET FLOW RATE - LITER/S                     42.1        (  668 GPM)
     INLET QUALITY - %                             30.0

 ** DISPOSAL
     NATURE                                     FINAL
     TYPE                                       LANDFILL
     LOCATION                                   ON-SITE
     SITE TRANSPORTATION METHOD                 TRUCK
     SITE TREATMENT                             NONE
     SITE CAPACITY - CU.M                         23481600     ( 19200.0 ACRE-FT)
```

CINCINNATI GAS & ELECTRIC: EAST BEND 2 (CONT.)

** WATER BALANCE
WATER LOOP TYPE CLOSED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM BEGAN INITIAL AND COMMERCIAL OPERATIONS IN MARCH 1981. NO MAJOR PROBLEMS WERE ENCOUNTERED DURING THIS TIME.

4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE FGD SYSTEM HAS OPERATED SINCE MID-MARCH WITH NO MAJOR PROBLEMS.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY PROBLEM ENCOUNTERED DURING THE THIRD QUARTER INVOLVED ONE OF THE TWO THICKENERS. THE PROBLEM NECESSITATED USE OF THE EMERGENCY ASH POND FOR A SHORT PERIOD OF TIME TO HANDLE THE SLUDGE BEING GENERATED.

THE UTILITY REPORTED THAT TESTING WITH STRAIGHT LIME WILL TAKE PLACE FOR A TWO TO THREE MONTH PERIOD BEGINNING IN NOVEMBER. CURRENTLY, THIOSORBIC LIME IS BEING USED. THE FGD SYSTEM WAS DESIGNED TO OPERATE WITH STRAIGHT LIME AS THE REAGENT AND, AS SUCH, THE TESTING WILL BE TO SEE IF THE SYSTEM CAN MEET DESIGN GUARANTEES.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLORADO UTE ELECTRIC
PLANT NAME	CRAIG
UNIT NUMBER	1
CITY	CRAIG
STATE	COLORADO
GROSS UNIT GENERATING CAPACITY - MW	455
NET UNIT GENERATING CAPACITY W/FGD - MW	400
EQUIVALENT SCRUBBED CAPACITY - MW	410

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	23260. (10000 BTU/LB)
AVERAGE ASH CONTENT - %	8.00
AVERAGE MOISTURE CONTENT - %	16.00
AVERAGE SULFUR CONTENT - %	.45
AVERAGE CHLORIDE CONTENT - %	********

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.80
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00
ENERGY CONSUMPTION - %	1.3
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	10/80
CONTRACT AWARDED	5/77

*** SLUDGE

** TREATMENT

METHOD	NR

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	33.3

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	.0	.0	.0	.0						
	B	59.7	70.2	71.0	55.4						
	C	48.9	59.8	60.5	47.2						
	D	11.3	12.6	12.7	9.9						
	SYSTEM	39.9	47.5	48.1	37.5	60.60		744	587	279	62.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE FGD SYSTEM EQUIPMENT CHECKOUT CONTINUED. MODULE A REMAINED OUT OF SERVICE BECAUSE THE MECHANICAL PARTS NEEDED FOR REPAIR WORK WERE NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	.0	.0	.0	.0						
	B	12.2	12.4	12.9	10.7						
	C	13.6	12.4	12.9	10.7						
	D	.0	.0	.0	.0						
	SYSTEM	8.6	8.3	8.6	7.1			672	580	36	64.2

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

THE CHECKOUT OF THE FGD SYSTEM EQUIPMENT CONTINUED DURING FEBRUARY. MODULE A NEEDED MECHANICAL PARTS FOR REPAIR. THREE OF THE FOUR MODULES WERE TO BE OPERATING BY THE END OF THE MONTH.

MODULES B AND C ENCOUNTERED PROBLEMS WITH THE INLET AND OUTLET DAMPERS DURING FEBRUARY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	.0	.0	.0	.0						
	B	.0	.0	.0	.0						
	C	.0	.0	.0	.0						
	D	35.5	35.5	35.7	35.5						
	SYSTEM	11.8	11.8	11.9	11.8	44.90		744	744	88	88.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH MODULES A, B, AND C EXPERIENCED OPERATING PROBLEMS WITH THE DAMPERS.

ADDITIONAL OUTAGE TIME WAS DUE TO THE READJUSTMENT OF THE FAN BLADE PITCHES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	.0	.0	.0	.0						
	B	36.1	59.9	60.9	35.6						
	C	2.8	4.2	4.3	2.5						
	D	25.0	40.5	41.2	23.9						
	SYSTEM	21.3	34.9	26.6	20.7			720	427	149	52.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST HALF OF APRIL THE SYSTEM EXPERIENCED PROBLEMS WITH THE DAMPERS AND CONTROLS MALFUNCTIONING. MODULE A NEEDED PARTS AND THE OTHER MODULES WERE REPAIRED.

ON APRIL 18 THE UNIT WAS SHUT DOWN FOR A SCHEDULED FIVE WEEK MAINTENANCE OUTAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	SYSTEM	.0	.0	.0	.0			744	101	0	
6/81	SYSTEM	.0	.0	.0	.0			720	699	0	97.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY AND JUNE THE SYSTEM WAS OUT OF SERVICE DUE TO DAMAGED MIST ELIMINATOR PADS AND PLUGGING OF THE MIST ELIMINATOR.

THICKENER REPAIRS WERE PERFORMED DURING JUNE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	.0	.0	.0	.0			744	724	0	58.9

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM REMAINED OFF LINE THROUGH JULY AS A RESULT OF THE BROKEN MIST ELIMINATOR TRAYS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	SYSTEM	.0	.0	.0	.0			744	709	0	90.0

** PROBLEMS/SOLUTIONS/COMMENTS

AS OF THE END OF AUGUST, MODULES A AND C WERE READY FOR OPERATION; HOWEVER, MODULE B NEEDED MORE MIST ELIMINATOR TRAYS.

COLORADO UTE ELECTRIC: CRAIG 1 (CONT.)

PERFORMANCE DATA											
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

DURING THE MONTH, THE THICKENER WAS DRAINED FOR REPAIRS THAT WERE EXPECTED TO BE COMPLETED BY THE MIDDLE OF SEPTEMBER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM	.0	.0	.0	.0			720	677	0	85.4

** PROBLEMS/SOLUTIONS/COMMENTS

MIST ELIMINATOR INSTALLATION WAS COMPLETED ON MODULES A,C, AND D BUT WAS CONTINUING ON MODULE B.

THE THICKENER WAS REFILLED AFTER WORK WAS COMPLETED TO REPAIR LEAKS IN THE BASE. AFTER REFILLING, MORE LEAKS WERE FOUND SO THE THICKENER WAS DRAINED AGAIN.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLORADO UTE ELECTRIC	
PLANT NAME	CRAIG	
UNIT NUMBER	2	
CITY	CRAIG	
STATE	COLORADO	
GROSS UNIT GENERATING CAPACITY - MW	455	
NET UNIT GENERATING CAPACITY W/FGD - MW	415	
EQUIVALENT SCRUBBED CAPACITY - MW	410	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
AVERAGE ASH CONTENT - %	8.00	
AVERAGE MOISTURE CONTENT - %	16.00	
AVERAGE SULFUR CONTENT - %	.45	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.80	
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00	
ENERGY CONSUMPTION - %	-2.0	
COMMERIAL START-UP DATE	5/80	
INITIAL START-UP DATE	12/79	
CONTRACT AWARDED	5/77	
*** SLUDGE		
** TREATMENT		
METHOD	NR	
** DISPOSAL		
TYPE	POND	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	33.3	
** FGD SPARE COMPONENT INDICES		
ABSORBER	1.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	67.2	66.0	66.2	65.9						
	B	.0	.0	.0	.0						
	C	79.8	78.2	78.4	77.9						
	D	89.2	88.9	89.2	88.7						
	SYSTEM	78.7	77.7	77.9	77.5	64.70		744	742	414	85.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULE B REMAINED OUT OF SERVICE DUE TO BOOSTER FAN BLADE PITCH PROBLEMS AND PROBLEMS WITH THE SYSTEM INTERLOCKS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	32.7	32.1	32.2	32.1						
	B	65.5	64.3	64.5	64.3						
	C	.0	.0	.0	.0						
	D	100.0	100.0	99.8	100.0						
	SYSTEM	66.1	65.5	65.7	65.5	61.40		672	672		90.1

```
-------------------------------------------------PERFORMANCE DATA-------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             PROBLEMS WERE ENCOUNTERED DURING THE MONTH WITH OPENING THE MODULE A, B,
                             AND C DAMPERS.

                             DURING FEBRUARY MODULE A ALSO ENCOUNTERED PLUGGAGE IN THE MOISTURE SEPARA-
                             TOR.

 3/81  A           68.5         69.8        70.1        67.9
       B           80.6         82.3        82.8        80.1
       C             .0           .0          .0          .0
       D           52.4         53.2        53.5        51.7
       SYSTEM      52.4         53.2        53.5        51.7    58.80             744   724    385  85.6

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING MARCH MODULES C AND D EXPERIENCED PROBLEMS WITH THE MIST ELIMINATOR
                             PLUGGING.

                             ADDITIONAL OUTAGE TIME OF MODULE C WAS DUE TO OPERATIONAL PROBLEMS OF THE
                             DAMPERS.

 4/81  SYSTEM        .0           .0          .0          .0                      720   596      0  59.3

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             THE SYSTEM DID NOT OPERATE DURING APRIL BECAUSE OF PLUGGED MIST
                             ELIMINATORS.  THE MIST ELIMINATORS ARE BEING CLEANED.

 5/81  SYSTEM        .0           .0          .0          .0                      744   744      0

 6/81  SYSTEM        .0           .0          .0          .0                      720   717      0  78.7

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING MAY AND JUNE THE SYSTEM WAS OUT OF SERVICE DUE TO DAMAGED MIST
                             ELIMINATOR PADS AND PLUGGING OF THE MIST ELIMINATOR.

 7/81  SYSTEM        .0           .0          .0          .0                      744   686      0  61.6

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             ALL MODULES REMAINED OUT OF SERVICE DURING JULY AS A RESULT OF THE BROKEN
                             MIST ELIMINATOR TRAYS.

 8/81  A             .0           .0          .0          .0
       B             .0           .0          .0          .0
       C           59.7         61.0        61.8        59.4
       D           39.5         40.5        41.0        39.4
       SYSTEM      33.1         33.8        34.3        32.9                      744   724    297  73.2

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             MODULES A AND B REMAINED DOWN DURING AUGUST AS THE UTILITY WAS WAITING FOR
                             NEW MIST ELIMINATOR TRAYS.

                             MODULE D WAS UNAVAILABLE FOR PART OF THE MONTH AS A RESULT OF PROBLEMS WITH
                             DAMPERS.

 9/81  A           18.1         18.4        18.6        17.8
       B           40.3         40.9        41.4        39.6
       C           81.9         83.6        84.5        80.8
```

COLORADO UTE ELECTRIC: CRAIG 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
	D	13.9	13.4	13.5	12.9						
	SYSTEM	51.4	52.1	52.7	50.4			720	696	538	81.5

** PROBLEMS/SOLUTIONS/COMMENTS

ALL FOUR MODULES BECAME OPERABLE TOWARDS THE END OF THE MONTH. MODULE D HAD BEEN OUT OF SERVICE AS A RESULT OF OUTLET DAMPER PROBLEMS. MODULE A WAS PUT IN SERVICE THE THIRD WEEK OF THE MONTH AFTER HAVING THE MIST ELIMINATORS REPLACED. THE MODULES ARE NOW BEING SHUT DOWN ON A REGULAR BASIS TO CLEAN THE MIST ELIMINATORS.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLUMBUS & SOUTHERN OHIO ELEC
PLANT NAME	CONESVILLE
UNIT NUMBER	5
CITY	CONESVILLE
STATE	OHIO
GROSS UNIT GENERATING CAPACITY - MW	411
NET UNIT GENERATING CAPACITY W/FGD - MW	375
EQUIVALENT SCRUBBED CAPACITY - MW	411

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25237.	(10850 BTU/LB)
AVERAGE ASH CONTENT - %	15.10	
AVERAGE MOISTURE CONTENT - %	7.50	
AVERAGE SULFUR CONTENT - %	4.67	
AVERAGE CHLORIDE CONTENT - %	.01	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.65
SO2 DESIGN REMOVAL EFFICIENCY - %	89.50
ENERGY CONSUMPTION - %	3.9
COMMERIAL START-UP DATE	2/77
INITIAL START-UP DATE	1/77
CONTRACT AWARDED	10/74

*** SLUDGE

** TREATMENT	
METHOD	FIXATION
** DISPOSAL	
TYPE	LANDFILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	90.6	85.7	87.4	77.4						
	B	90.5	86.0	84.9	77.2						
	SYSTEM	90.5	86.0	84.9	77.2	95.80		744	672	575	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	93.2	89.9	91.2	83.4						
	B	95.4	94.9	93.6	88.1						
	SYSTEM	94.2	92.3	92.4	85.7			672	624	576	100.0

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 5 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	3.7	15.7	21.0	.5						
	B	4.0	23.5	31.0	.9						
	SYSTEM	3.9	19.6	26.0	.7	95.80		744	26	5	1.6

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MOST OF MARCH THE BOILER AND FGD SYSTEM WERE OFF LINE FOR SCHEDULED MAINTENANCE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	98.9	83.7	90.1	64.5						
	B	94.3	78.6	84.5	60.6						
	SYSTEM	96.6	81.1	87.3	63.8			720	555	450	
5/81	A	99.7	100.0	100.0	95.0						
	B	99.7	100.0	100.0	95.0						
	SYSTEM	99.7	100.0	100.0	95.0			744	707	707	
6/81	A	99.4	100.0	100.0	96.4						
	B	98.5	100.0	100.0	96.9						
	SYSTEM	99.0	100.0	100.0	96.9			720	698	698	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR OPERATIONAL PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	99.8	100.0	100.0	55.4						
	B	100.0	100.0	100.0	55.4						
	SYSTEM	99.9	100.0	100.0	55.4			744	412	412	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, THE BOILER ONLY OPERATED 412 HOURS AS A RESULT OF FAILURE OF A BOILER FEED PUMP.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	A	99.0	76.0	95.0	43.0						
	B	99.0	30.0	88.0	39.0						
	SYSTEM	99.0	53.0	91.5	41.0			744	422	305	
9/81	A	100.0	59.0	100.0	6.0						
	B	87.0	48.0	81.0	5.0						
	SYSTEM	93.5	53.5	90.5	5.5			720	69	41	

** PROBLEMS/SOLUTIONS/COMMENTS

SEVERE OUTLET DUCT CORROSION HAS OCCURRED ON UNIT 5. THE GUNITE LINER HAS FAILED DUE TO INADEQUATE STRENGTH OF THE SUPPORTING MESH. THE UTILITY IS LOOKING INTO INCONEL OR FRP AS A REPLACEMENT LINER.

UNIT 5 WAS REMOVED FROM SERVICE ON SEPTEMBER 19 AS A RESULT OF LOW DEMAND. THE UNIT IS NOT EXPECTED TO BE BROUGHT BACK ON LINE UNTIL DECEMBER. THIS OUTAGE PERIOD WILL BE UTILIZED FOR OUTLET DUCTWORK REPAIRS.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COLUMBUS & SOUTHERN OHIO ELEC
PLANT NAME	CONESVILLE
UNIT NUMBER	6
CITY	CONESVILLE
STATE	OHIO
GROSS UNIT GENERATING CAPACITY - MW	411
NET UNIT GENERATING CAPACITY W/FGD - MW	375
EQUIVALENT SCRUBBED CAPACITY - MW	411

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	25237. (10850 BTU/LB)
AVERAGE ASH CONTENT - %	15.10
AVERAGE MOISTURE CONTENT - %	7.50
AVERAGE SULFUR CONTENT - %	4.67
AVERAGE CHLORIDE CONTENT - %	.01

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.65
SO2 DESIGN REMOVAL EFFICIENCY - %	89.50
ENERGY CONSUMPTION - %	3.9
COMMERIAL START-UP DATE	7/78
INITIAL START-UP DATE	6/78
CONTRACT AWARDED	10/74

*** SLUDGE

** TREATMENT

METHOD	FIXATION

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	97.6	92.7	92.7	92.7						
	B	98.4	90.5	90.4	90.4						
	SYSTEM	97.9	92.0	91.5	91.5	92.30		744	744	681	79.0
2/81	A	89.7	81.0	81.3	74.7						
	B	95.2	89.2	89.6	82.3						
	SYSTEM	92.4	85.0	85.4	78.4	92.30		672	620	528	75.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY AND FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	74.7	96.6	98.0	58.9						
	B	75.0	97.5	99.0	59.4						
	SYSTEM	74.9	97.0	98.5	59.1			744	453	440	57.7

COLUMBUS & SOUTHERN OHIO ELEC: CONESVILLE 6 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE MAJORITY OF OUTAGE TIME DURING MARCH WAS THE RESULT OF LOW BOILER LOAD OR A LACK OF POWER DEMAND.

DURING THE MONTH SOME MINOR PROBLEMS WERE ENCOUNTERED WITH VARIOUS PIECES OF AUXILIARY EQUIPMENT. NO PROBLEMS WERE EXPERIENCED WITH EITHER MODULE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	53.3	95.0	99.1	31.9						
	B	49.4	100.0	100.0	33.6						
	SYSTEM	51.4	97.5	99.5	32.8			720	242	236	

** PROBLEMS/SOLUTIONS/COMMENTS

ON MAY 1, THE UNIT WAS OUT OF SERVICE FOR A SCHEDULED OUTAGE. THE UNIT REMAINED OFF LINE THROUGH MAY 14.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	A	99.6	100.0	100.0	83.3						
	B	99.6	100.0	100.0	83.3						
	SYSTEM	99.6	100.0	100.0	83.3			744	620	620	
6/81	A	99.2	100.0	100.0	90.0						
	B	99.2	100.0	100.0	90.0						
	SYSTEM	99.2	100.0	100.0	90.0			720	648	648	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR OPERATIONAL PROBLEMS WERE ENCOUNTERED DURING MAY AND JUNE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	99.6	100.0	100.0	73.9						
	B	99.2	100.0	100.0	73.9						
	SYSTEM	99.4	100.0	100.0	73.9			744	550	550	
8/81	A	99.0	90.0	94.0	74.0						
	B	98.0	89.0	92.0	73.0						
	SYSTEM	98.5	89.5	93.0	73.5			744	607	547	
9/81	A	100.0	85.0	94.0	35.0						
	B	89.0	87.0	97.0	36.0						
	SYSTEM	94.5	86.0	95.5	35.5			720	297	256	

** PROBLEMS/SOLUTIONS/COMMENTS

SEVERE OUTLET DUCT CORROSION HAS OCCURRED ON UNIT 6. THE GUNITE LINER HAS FAILED DUE TO INADEQUATE STRENGTH OF THE SUPPORTING MESH. THE UTILITY IS LOOKING INTO INCONEL OR FRP AS A REPLACEMENT LINER.

UNIT 6 WAS REMOVED FROM SERVICE ON SEPTEMBER 19 AS A RESULT OF LOW DEMAND. THE UNIT IS NOT EXPECTED TO BE BROUGHT BACK ON LINE UNTIL DECEMBER. THIS OUTAGE PERIOD WILL BE UTILIZED FOR OUTLET DUCTWORK REPAIRS.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COMMONWEALTH EDISON
PLANT NAME	POWERTON
UNIT NUMBER	51
CITY	PEKIN
STATE	ILLINOIS
GROSS UNIT GENERATING CAPACITY - MW	450
NET UNIT GENERATING CAPACITY W/FGD - MW	400
EQUIVALENT SCRUBBED CAPACITY - MW	450
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	******
AVERAGE HEAT CONTENT - J/G	24516. (10540 BTU/LB)
AVERAGE ASH CONTENT - %	9.16
AVERAGE MOISTURE CONTENT - %	16.34
AVERAGE SULFUR CONTENT - %	3.53
AVERAGE CHLORIDE CONTENT - %	.20
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	********
SO2 DESIGN REMOVAL EFFICIENCY - %	75.50
ENERGY CONSUMPTION - %	5.6
COMMERIAL START-UP DATE	6/81
INITIAL START-UP DATE	4/80
CONTRACT AWARDED	2/76
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
** DISPOSAL	
TYPE	POND

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM				.0			744	0	0	.0
2/81	SYSTEM				.0			672	0	0	.0
3/81	SYSTEM				.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE FGD SYSTEM WAS NOT OPERATED. REPAIRS ARE BEING MADE TO THE BOILER AND OTHER DAMAGED AREAS DUE TO THE FIRE IN NOVEMBER 1980.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM				.0			720		0	
5/81	SYSTEM				.0			744		0	
6/81	SYSTEM				.0			720		0	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER 1981 THE FGD SYSTEM WAS NOT OPERATED. FIRE REPAIRS TO THE BOILER AND OTHER DAMAGED AREAS HAVE BEEN COMPLETED. THE BOILER CAME BACK ON-LINE IN APRIL.

COMMONWEALTH EDISON: POWERTON 51 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM				.0			744		0	
8/81	SYSTEM				.0			744		0	
9/81	SYSTEM				.0			720		0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS NOT OPERATED DURING THE THIRD QUARTER 1981. THE UTILITY DOES NOT ANTICIPATE RUNNING AN ACCEPTANCE TEST BEFORE THE END OF THE YEAR.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COOPERATIVE POWER ASSOCIATION
PLANT NAME	COAL CREEK
UNIT NUMBER	1
CITY	UNDERWOOD
STATE	NORTH DAKOTA
GROSS UNIT GENERATING CAPACITY - MW	545
NET UNIT GENERATING CAPACITY W/FGD - MW	495
EQUIVALENT SCRUBBED CAPACITY - MW	327

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	14556.	(6258 BTU/LB)
AVERAGE ASH CONTENT - %	7.14	
AVERAGE MOISTURE CONTENT - %	39.83	
AVERAGE SULFUR CONTENT - %	.63	
AVERAGE CHLORIDE CONTENT - %	.02	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME/ALKALINE FLYASH
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	54.00
ENERGY CONSUMPTION - %	*******
COMMERCIAL START-UP DATE	8/79
INITIAL START-UP DATE	7/79
CONTRACT AWARDED	**/**

*** SLUDGE

** TREATMENT

METHOD	FIXATION

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	11	100.0	45.2		45.2						
	12	100.0	46.8		46.8						
	13	100.0	38.7		38.7						
	14	100.0	44.6		44.6						
	SYSTEM	100.0	43.8		43.8			744	744	326	58.3
2/81	11	82.5	57.4		47.5						
	12	82.5	79.1		65.2						
	13	82.5	71.8		59.2						
	14	82.5	1.8		1.5						
	SYSTEM	82.5	52.5		43.3			672	554	291	45.6
3/81	11	47.4	50.4		23.9						
	12	47.4	73.7		34.9						
	13	47.4	57.8		27.4						
	14	47.4	58.4		29.0						
	SYSTEM	47.4	60.9		28.8			744	353	215	30.7

COOPERATIVE POWER ASSOCIATION: COAL CREEK 1 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 VIBRATION PROBLEMS WERE EXPERIENCED CAUSING FAILURE OF THE REACTION TANK BLADES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	11	100.0	64.7	100.0	64.7						
	12	100.0	94.7	100.0	94.7						
	13	100.0	36.7	100.0	36.7						
	14	100.0	87.2	100.0	87.2						
	SYSTEM	100.0	70.8	100.0	70.8			720	720	510	68.6
5/81	11	100.0	62.9	100.0	62.9						
	12	100.0	65.6	100.0	65.6						
	13	100.0	31.5	100.0	31.5						
	14	100.0	39.0	100.0	39.0						
	SYSTEM	100.0	49.7	100.0	49.7			744	744	370	68.3
6/81	11	100.0	51.3	100.0	47.2						
	12	100.0	76.9	100.0	70.8						
	13	100.0	15.7	100.0	14.4						
	14	100.0	10.6	100.0	9.7						
	SYSTEM	100.0	38.6	100.0	35.6			720	663	256	57.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	11		34.3		34.1						
	12		49.9		49.7						
	13		8.9		8.9						
	14		54.8		54.6						
	SYSTEM		37.0		36.8			744	741	274	55.3
8/81	11		41.5		33.3						
	12		46.6		37.4						
	13		8.0		6.5						
	14		84.4		67.7						
	SYSTEM		45.2		36.3			744	597	270	62.9
9/81	SYSTEM				.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR OPERATIONAL PROBLEMS WERE REPORTED FOR THE MONTHS OF JULY AND AUGUST. THE UNIT WAS TAKEN OFF LINE IN SEPTEMBER FOR AN ANNUAL OUTAGE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	COOPERATIVE POWER ASSOCIATION
PLANT NAME	COAL CREEK
UNIT NUMBER	2
CITY	UNDERWOOD
STATE	NORTH DAKOTA
GROSS UNIT GENERATING CAPACITY - MW	545
NET UNIT GENERATING CAPACITY W/FGD - MW	495
EQUIVALENT SCRUBBED CAPACITY - MW	327
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	LIGNITE
AVERAGE HEAT CONTENT - J/G	14556. (6258 BTU/LB)
AVERAGE ASH CONTENT - %	7.14
AVERAGE MOISTURE CONTENT - %	39.83
AVERAGE SULFUR CONTENT - %	.63
AVERAGE CHLORIDE CONTENT - %	.02
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIME/ALKALINE FLYASH
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	54.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	9/80
INITIAL START-UP DATE	7/80
CONTRACT AWARDED	**/**
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
** DISPOSAL	
TYPE	POND

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	21	99.8	75.7		75.5						
	22	99.8	37.6		37.5						
	23	99.8	46.3		46.2						
	24	99.8	68.9		68.8						
	SYSTEM	99.8	57.1		57.0			744	743	424	57.2
2/81	21	99.7	72.5		72.5						
	22	99.7	37.9		37.8						
	23	99.7	32.8		32.7						
	24	99.7	82.6		82.4						
	SYSTEM	99.7	56.5		56.4			672	670	379	57.6
3/81	21	55.4	56.3		31.2						
	22	55.4	44.7		24.7						
	23	55.4	27.7		15.3						
	24	55.4	91.3		50.5						
	SYSTEM	55.4	55.1		30.5			744	412	227	39.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

COOPERATIVE POWER ASSOCIATION: COAL CREEK 2 (CONT.)

PERFORMANCE DATA

ON MARCH 17 THE BOILER WAS TAKEN OUT OF SERVICE FOR A BOILER/TURBINE OVERHAUL, MAINTENANCE AND MODIFICATIONS. THE UNIT WILL BE OUT OF SERVICE FOR APPROXIMATELY TEN WEEKS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	21	100.0			.0						
	22	100.0			.0						
	23	100.0			.0						
	24	100.0			.0						
	SYSTEM	100.0			.0			720	0	0	.0
5/81	21	100.0			.0						
	22	100.0			.0						
	23	100.0			.0						
	24	100.0			.0						
	SYSTEM	100.0			.0			744	0	0	.0
6/81	21	100.0	26.5	100.0	10.3						
	22	100.0	10.0	100.0	3.9						
	23	100.0	56.6	100.0	21.9						
	24	100.0	18.6	100.0	7.2						
	SYSTEM	100.0	27.9	100.0	10.8			720	279	78	50.3

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT WAS OFF-LINE DUE TO BOILER/TURBINE WARRANTY INSPECTION DURING THE MONTHS OF APRIL, MAY, AND PART OF JUNE.

DURING THE SECOND QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	21		72.5		63.7						
	22		9.5		8.3						
	23		60.6		53.2						
	24		23.9		21.0						
	SYSTEM		41.6		36.6			744	654	272	53.3
8/81	21		44.9		35.5						
	22		34.7		27.4						
	23		55.8		44.1						
	24		38.4		30.4						
	SYSTEM		43.5		34.4			744	588	256	51.0
9/81	21		16.6		16.4						
	22		91.8		90.6						
	23		50.1		49.4						
	24		82.8		81.7						
	SYSTEM		60.4		59.6			720	710	429	69.8

** PROBLEMS/SOLUTIONS/COMMENTS

NO FGD RELATED PROBLEMS WERE REPORTED FOR THE THREE MONTH PERIOD.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DELMARVA POWER & LIGHT	
PLANT NAME	DELAWARE CITY	
UNIT NUMBER	1	
CITY	DELAWARE CITY	
STATE	DELAWARE	
GROSS UNIT GENERATING CAPACITY - MW	60	
NET UNIT GENERATING CAPACITY W/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	60	
** FUEL DATA		
FUEL TYPE	COKE	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	32564.	(14000 BTU/LB)
AVERAGE ASH CONTENT - %	.50	
AVERAGE MOISTURE CONTENT - %	.70	
AVERAGE SULFUR CONTENT - %	7.00	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	WELLMAN LORD	
SYSTEM SUPPLIER	DAVY MCKEE	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	90.00	
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	*******	
COMMERIAL START-UP DATE	5/80	
INITIAL START-UP DATE	5/80	
CONTRACT AWARDED	9/77	
*** SALEABLE BYPRODUCT		
BYPRODUCT NATURE	SULFURIC ACID	
DISPOSITION	MARKETED	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	90.0	90.0	90.0	90.0			744	744	670	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	86.0	84.0	84.0	76.0			672	607	512	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY OUTAGE TIME WAS DUE TO LEAKS IN THE MIST ELIMINATOR AND FAILURE OF THE PRESCRUBBER SPRAY NOZZLES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	95.6	95.6	95.6	95.4			744	743	710	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	74.0	83.0	83.0	74.0			720	643	531	

DELMARVA POWER & LIGHT: DELAWARE CITY 1 (CONT.)

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----------------------------------------------PERFORMANCE DATA-------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING APRIL SOME OUTAGE TIME WAS CAUSED BY THE REPAIRS TO THE MIST ELIMI-
                             NATOR SHELL AND INTERNALS.

                             ADDITIONAL OUTAGE TIME WAS DUE TO THE REPLACEMENT OF THE BOOSTER BLOWER
                             DISCHARGE DUCT EXPANSION JOINT.

 5/81  SYSTEM       98.1        98.1        98.1        98.1                  744   744    730

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING MAY REPAIRS WERE PERFORMED ON THE MIST ELIMINATOR SHELL.

 6/81  SYSTEM      100.0       100.0       100.0       100.0                  720   720    720

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             THE UTILITY REPORTED THAT NO PROBLEMS WERE ENCOUNTERED DURING JUNE.

 7/81  SYSTEM       99.2        99.2        99.2        99.2                  744   744    738

 8/81  SYSTEM       77.4        77.4        77.4        46.9                  744   451    349

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             DURING AUGUST, EXTENSIVE REPAIRS WERE MADE TO THE VENTURI PRESCRUBBER BRICK
                             WORK DURING A SCHEDULED BOILER OUTAGE.

 9/81  SYSTEM       95.1        95.1        95.1        95.0                  720   719    684

       ** PROBLEMS/SOLUTIONS/COMMENTS

                             THE FGD SYSTEM WAS DOWN FOR PART OF SEPTEMBER FOR REPAIRS TO THE PRESCRUB-
                             BER MIST ELIMINATOR.
```

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DELMARVA POWER & LIGHT
PLANT NAME	DELAWARE CITY
UNIT NUMBER	2
CITY	DELAWARE CITY
STATE	DELAWARE
GROSS UNIT GENERATING CAPACITY - MW	60
NET UNIT GENERATING CAPACITY W/FGD - MW	495
EQUIVALENT SCRUBBED CAPACITY - MW	60

** FUEL DATA

FUEL TYPE	COKE	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	32564.	(14000 BTU/LB)
AVERAGE ASH CONTENT - %	.50	
AVERAGE MOISTURE CONTENT - %	.70	
AVERAGE SULFUR CONTENT - %	7.00	
AVERAGE CHLORIDE CONTENT - %	********	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	WELLMAN LORD
SYSTEM SUPPLIER	DAVY MCKEE
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	90.00
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	5/80
INITIAL START-UP DATE	5/80
CONTRACT AWARDED	9/77

*** SALEABLE BYPRODUCT

BYPRODUCT NATURE	SULFURIC ACID
DISPOSITION	MARKETED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	93.0	93.0	93.0	93.0			744	744	692	
2/81	SYSTEM	96.0	96.0	96.0	96.0			672	672	648	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY AND FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	57.5	89.0	89.0	57.5			744	481	428	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER WAS OUT OF SERVICE FOR PART OF THE MONTH DUE TO AN OVERHAUL.

REPAIRS TO A LEAK IN THE MIST ELIMINATOR CAUSED SOME OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	64.0	84.0	84.0	64.0			720	553	464	

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 167 HOURS DURING APRIL DUE TO A SCHEDULED MAINTENANCE OUTAGE.

THE FGD SYSTEM WAS UNAVAILABLE APPROXIMATELY 256 HOURS DUE TO THE REPLACEMENT OF THE PRESATURATOR MIST ELIMINATOR INTERNALS AND THE BRICK LINING.

DELMARVA POWER & LIGHT: DELAWARE CITY 2 (CONT.)

		PERFORMANCE DATA									
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	SYSTEM	97.5	97.5	97.5	97.5			744	744	726	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY REPAIRS WERE PERFORMED ON THE BOOSTER BLOWER INSPECTION DOOR.

6/81	SYSTEM	75.8	75.8	75.8	75.8			720	720	546	

** PROBLEMS/SOLUTIONS/COMMENTS

ON JUNE 23 THE SYSTEM WAS SHUT DOWN DUE TO A HIGH PRESSURE DROP. ON INSPECTION, IT WAS DESCOVERED THAT THE PRESATURATOR NOZZLE HAD FAILED, THERE WAS A CONSIDERABLE COKE BUILDUP IN THE PRESATURATOR MIST ELIMINATOR BOX, THE MIST ELIMINATOR CHEVRONS HAD FAILED, THERE WAS A LARGE COKE BUILDUP IN THE ESP INLET SEAL POT AND A HIGH SOLIDS BUILDUP IN THE BOTTOM OF THE SO2 ABSORBER. REPAIRS CONSISTED OF REPLACING THE PRESATURATOR NOZZLE TIP AND CLEANING THE BUILDUP.

7/81	SYSTEM	76.9	76.9	76.9	76.9			744	744	572	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, THE ACID BRICK LINING ON THE INLET TO THE PRESCRUBBER FAILED. IN ADDITION, PROBLEMS WERE ENCOUNTERED WITH THE PRESCRUBBER NOZZLE TIP.

8/81	SYSTEM	97.8	97.8	97.8	97.8			744	744	728	
9/81	SYSTEM	99.2	96.3	96.3	86.7			720	648	624	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING SEPTEMBER, THE BOILER WAS OFF LINE FOR 72 HOURS TO REPAIR A SUPERHEATER TUBE LEAK.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DELMARVA POWER & LIGHT	
PLANT NAME	DELAWARE CITY	
UNIT NUMBER	3	
CITY	DELAWARE CITY	
STATE	DELAWARE	
GROSS UNIT GENERATING CAPACITY - MW	60	
NET UNIT GENERATING CAPACITY W/FGD - MW	495	
EQUIVALENT SCRUBBED CAPACITY - MW	60	
** FUEL DATA		
FUEL TYPE	COKE	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	32564.	(14000 BTU/LB)
AVERAGE ASH CONTENT - %	.50	
AVERAGE MOISTURE CONTENT - %	.70	
AVERAGE SULFUR CONTENT - %	7.00	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	WELLMAN LORD	
SYSTEM SUPPLIER	DAVY MCKEE	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	90.00	
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	*******	
COMMERIAL START-UP DATE	5/80	
INITIAL START-UP DATE	5/80	
CONTRACT AWARDED	9/77	
*** SALEABLE BYPRODUCT		
BYPRODUCT NATURE	SULFURIC ACID	
DISPOSITION	MARKETED	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	64.0	64.0	64.0	64.0			744	744	479	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY PROBLEMS WERE ENCOUNTERED WITH LEAKS IN THE RECIRCULATION PIPES AND THE MIST ELIMINATOR CAUSING OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	88.0	88.0	88.0	88.0			672	672	590	

** PROBLEMS/SOLUTIONS/COMMENTS

FAILURE OF THE RECIRCULATION PUMPS CAUSED SOME OUTAGE TIME DURING FEBRUARY.

LEAKS IN THE RECIRCULATION PIPES CAUSED ADDITIONAL OUTAGE TIME DURING THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	83.3	83.3	83.3	83.3			744	744	620	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH DOWNTIME WAS EXPERIENCED DUE TO CONTINUING REPAIRS TO THE RECIRCULATION PIPES.

ADDITIONAL OUTAGE TIME WAS DUE TO THE REPAIRS TO THE MIST ELIMINATOR.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	93.0	93.0	93.0	93.0			720	720	669	

DELMARVA POWER & LIGHT: DELAWARE CITY 3 (CONT.)

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-------------------------------------------PERFORMANCE DATA-------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL  PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
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       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING APRIL SOME OUTAGE TIME WAS DUE TO REPAIRS ON A HOLE IN THE ESP CELL.

                           ADDITIONAL OUTAGE TIME WAS DUE TO THE REPLACEMENT OF A PRESATURATOR
                           SPRAY NOZZLE.

 5/81  SYSTEM     76.1        76.1        76.1        76.1                     744   744   566

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING MAY THE PRESATURATOR SHELL MATERIAL FAILED AND AN OUTAGE WAS NECES-
                           SARY TO REPAIR THE HOLE.

                           THE PRESATURATOR SPRAY NOZZLE FAILED ACCOUNTING FOR ADDITIONAL OUTAGE
                           TIME.

 6/81  SYSTEM    100.0       100.0       100.0       100.0                     720   720   720

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           THE UTILITY REPORTED THAT NO PROBLEMS WERE ENCOUNTERED DURING JUNE.

 7/81  SYSTEM     98.9        98.9        98.9        98.9                     744   744   736

 8/81  SYSTEM    100.0       100.0       100.0       100.0                     744   744   744

 9/81  SYSTEM     89.9        90.0        90.0        89.9                     720   719   647

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           THE FGD SYSTEM WAS OFF LINE FOR PART OF SEPTEMBER TO REPAIR THE ABSORBER
                           MIST ELIMINATOR.
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SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DUQUESNE LIGHT
PLANT NAME	ELRAMA
UNIT NUMBER	1-4
CITY	ELRAMA
STATE	PENNSYLVANIA
GROSS UNIT GENERATING CAPACITY - MW	510
NET UNIT GENERATING CAPACITY W/FGD - MW	475
EQUIVALENT SCRUBBED CAPACITY - MW	510

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	26400.	(11350 BTU/LB)
AVERAGE ASH CONTENT - %	21.00	
AVERAGE MOISTURE CONTENT - %	********	
AVERAGE SULFUR CONTENT - %	2.20	
AVERAGE CHLORIDE CONTENT - %	********	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	83.00
ENERGY CONSUMPTION - %	3.5
COMMERIAL START-UP DATE	10/75
INITIAL START-UP DATE	10/75
CONTRACT AWARDED	12/70

*** SLUDGE

** TREATMENT

METHOD	FIXATION

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	25.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/80	101	73.0	55.1	67.1	55.1						
	201	100.0	81.3	100.0	81.3						
	301	98.9	94.6	98.9	94.6						
	401	48.4	48.4	48.4	48.4						
	501	94.9	93.4	94.8	93.4						
	SYSTEM	100.0	93.3	100.0	93.3			744	744	694	54.8
1/81	101	100.0	100.0	100.0	100.0						
	201	92.5	51.1	87.1	51.1						
	301	100.0	96.6	100.0	96.6						
	401	32.2	.0	.0	.0						
	501	88.2	51.1	81.2	51.1						
	SYSTEM	100.0	74.7	92.1	74.7			744	744	556	41.0

DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

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-------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
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       ** PROBLEMS/SOLUTIONS/COMMENTS

                            THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED
                            DURING DECEMBER AND JANUARY.

 2/81  101          92.1        51.6        73.5        51.6
       201          99.1        86.5        88.2        86.5
       301          98.9        93.2        98.9        93.2
       401           3.6         3.6         3.6         3.6
       501          95.2        93.6        95.2        93.6
       SYSTEM       97.2        82.1        89.9        82.1                    672   672    552  33.6

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING FEBRUARY THE RUBBER LININGS ON THE FAN HOUSINGS OF MODULES 201 AND
                            301 WERE REPLACED WITH INCONEL 825.

 3/81  101          59.8        38.7        49.1        38.7
       201          59.1        59.1        59.1        59.1
       301          53.6        53.6        53.6        53.6
       401          21.1        21.1        21.1        21.1
       501          59.9        58.9        59.5        58.9
       SYSTEM       63.4        57.9        60.6        57.9                    744   744    431  41.4

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            UTILITY REPORTED THAT THE LOW BOILER CAPACITY FACTOR FOR THE MONTH OF MARCH
                            WAS DUE TO THE COAL STRIKE (BOILERS WERE RUN AT REDUCED LOAD TO CONSERVE
                            FUEL).  GENERAL CLEANING WAS PERFORMED ON BOTH BOILERS AND FGD SYSTEM
                            DURING THE MONTH.

                            THE FGD SYSTEM WAS DOWN FOR 10 DAYS TO REPAIR THE DUCTWORK AND EXPANSION
                            JOINT LOCATED AT THE STACK.  DURING THE OUTAGE, THE STACK, DAMPERS, AND
                            REMAINING EXPANSION JOINTS WERE INSPECTED.  THE STACK INSPECTION SHOWED
                            MINOR DETERIORATION OF THE STACK FLUE.

 4/81  101          88.1        76.9        86.6        76.9
       201          72.3        46.2        62.5        46.2
       301          90.0        82.6        89.2        82.6
       401          86.7        85.6        86.6        85.6
       501          94.2        82.3        93.4        82.3
       SYSTEM      100.0        93.4       100.0        93.4                    720   719    672  68.6

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF APRIL.

                            THE RUBBER COATED FAN HOUSING ON NUMBER 401 ID FAN WAS SPRAYED WITH A
                            POLYURETHANE COATING TO PROTECT AGAINST CORROSION/EROSION EFFECTS.

                            SODIUM THIOSULFATE ADDITION WAS INITIATED IN APRIL TO AID AGAINST
                            SCALING (HIGH EXCESS AIR PROBLEMS WHEN BOILERS RUN AT REDUCED LOADS).

 5/81  101         100.0        96.7       100.0        96.7
       201            .0          .0          .0          .0
       301         100.0       100.0       100.0       100.0
       401         100.0        67.0       100.0        67.0
       501          88.7        50.2        81.7        50.2
       SYSTEM       97.2        78.5        95.4        78.5                    744   744    584  46.7
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DUQUESNE LIGHT: ELRAMA 1-4 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH OF MAY THE INGERSOLL RAND RECYCLE PUMPS ON MODULE 201 WERE REPLACED WITH RUBBER LINED WORMAN PUMPS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	101	95.4	92.6	97.1	92.6						
	201	61.7	61.7	61.7	61.7						
	301	93.3	86.0	92.8	86.0						
	401	88.3	76.7	86.8	76.7						
	501	63.9	41.5	53.5	41.5						
	SYSTEM	100.0	89.6	98.0	89.6			720	720	645	58.0
7/81	101	98.9	86.0	98.8	86.0						
	201	100.0	98.9	100.0	98.9						
	301	.0	.0	.0	.0						
	401	98.4	93.3	98.2	93.3						
	501	100.0	100.0	100.0	100.0						
	SYSTEM	99.3	94.6	99.3	94.6			744	744	704	67.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, MODULE 301 WAS OUT OF SERVICE FOR GENERAL CLEANING AND FOR THE INSTALLATION OF POLYURETHANE IN THE FAN HOUSING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	101	97.3	90.5	97.3	90.5						
	201	98.9	58.5	98.2	58.5						
	301	.0	.0	.0	.0						
	401	97.7	95.6	97.5	95.6						
	501	97.4	80.9	96.9	80.9						
	SYSTEM	97.8	81.4	97.5	81.4			744	744	606	43.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 301 REMAINED DOWN DURING AUGUST FOR MAINTENANCE AND CLEANING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTH OF SEPTEMBER WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	DUQUESNE LIGHT	
PLANT NAME	PHILLIPS	
UNIT NUMBER	1-6	
CITY	SOUTH HEIGHT	
STATE	PENNSYLVANIA	
GROSS UNIT GENERATING CAPACITY - MW	408	
NET UNIT GENERATING CAPACITY W/FGD - MW	373	
EQUIVALENT SCRUBBED CAPACITY - MW	408	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26830.	(11535 BTU/LB)
AVERAGE ASH CONTENT - %	16.27	
AVERAGE MOISTURE CONTENT - %	5.02	
AVERAGE SULFUR CONTENT - %	1.92	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00	
SO2 DESIGN REMOVAL EFFICIENCY - %	83.00	
ENERGY CONSUMPTION - %	3.4	
COMMERIAL START-UP DATE	6/74	
INITIAL START-UP DATE	7/73	
CONTRACT AWARDED	7/71	
*** SLUDGE		
** TREATMENT		
METHOD	FIXATION	
** DISPOSAL		
TYPE	LANDFILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/80	101	100.0	99.9	100.0	99.9						
	201	1.3	.0	.0	.0						
	301	100.0	98.8	100.0	98.8						
	401	100.0	88.1	100.0	88.1						
	SYSTEM	75.3	71.7	75.0	71.7			744	744	534	62.2
1/81	101	100.0	100.0	100.0	100.0						
	201	.0	.0	.0	.0						
	301	87.8	85.5	87.5	85.5						
	401	98.8	91.2	98.7	91.2						
	SYSTEM	71.7	69.2	71.6	69.2			744	744	533	56.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING DECEMBER AND JANUARY.

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	101	95.3	86.6	94.8	86.6						
	201	74.9	73.6	74.6	73.6						
	301	28.4	23.8	24.9	23.8						
	401	100.0	93.1	100.0	93.1						
	SYSTEM	74.7	69.3	73.6	69.3			672	672	466	47.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY A ROUTINE INSPECTION OF THE STACK REVEALED DETERIORATION OF THE ACID-RESISTANT BRICK AND MORTAR, WHICH WILL NECESSITATE REPLACEMENT IN THE NEAR FUTURE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	101	97.2	97.2	97.2	97.2						
	201	99.1	99.1	99.1	99.1						
	301	.0	.0	.0	.0						
	401	96.7	96.7	96.7	96.7						
	SYSTEM	73.3	73.3	73.3	73.3			744	744	545	72.8
4/81	101	93.9	81.0	92.9	81.0						
	201	98.5	97.2	98.5	97.2						
	301	18.5	18.5	18.5	18.5						
	401	82.3	82.3	82.3	82.3						
	SYSTEM	73.3	69.8	73.1	69.8			720	720	502	59.7
5/81	101	92.7	80.3	91.7	80.3						
	201	100.0	93.4	100.0	93.4						
	301	92.3	91.1	92.2	91.1						
	401	.0	.0	.0	.0						
	SYSTEM	71.3	66.2	71.0	66.2			744	744	493	60.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH, APRIL, AND MAY.

DURING THE MONTH OF MAY, REPLACEMENT OF THE RUBBER-LINED CARBON STEEL HOUSING WITH INCOLEY 825 ON NUMBER 401 ID FAN WAS INITIATED. HOUSING REPLACEMENTS ON FANS 201 AND 301 HAVE BEEN COMPLETED.

SODIUM THIOSULFATE ADDITION WAS UTILIZED THROUGHOUT THE MONTHS OF MARCH, APRIL, AND MAY TO REDUCE SCALING ENHANCED BY HIGH EXCESS AIR REQUIREMENTS OF THE BOILERS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	101	100.0	97.9	100.0	97.9						
	201	100.0	95.7	100.0	95.7						
	301	100.0	98.1	100.0	98.1						
	401	.0	.0	.0	.0						
	SYSTEM	75.0	72.9	75.0	72.9			720	720	525	68.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 401 WAS OUT OF SERVICE DURING JUNE SO THAT THE FAN HOUSING COULD BE REPLACED WITH INCONEL.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	101	97.7	97.0	97.7	97.0						
	201	98.3	93.1	98.0	93.1						
	301	97.8	96.4	97.8	96.4						
	401	.0	.0	.0	.0						
	SYSTEM	73.5	71.6	73.4	71.6			744	744	533	69.8

DUQUESNE LIGHT: PHILLIPS 1-6 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 401 REMAINED OUT OF SERVICE DUE TO FAN REPAIRS AND GENERAL CLEANING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	101	87.0	75.0	83.9	67.7						
	201	90.2	74.1	87.1	66.9						
	301	87.0	87.9	85.9	79.4						
	401	35.5	18.9	20.9	17.1						
	SYSTEM	74.9	64.0	69.5	57.8			744	672	430	35.0

** PROBLEMS/SOLUTIONS/COMMENTS

PHILLIPS WAS SHUT DOWN FOR THREE DAYS IN AUGUST FOR A STACK AND FGD SYSTEM INSPECTION. THE PRELIMINARY REPORT INDICATED STACK DETERIORATION TO THE POINT OF DAMAGING THE STACK INTEGRITY. AS A RESULT, THE UTILITY PLANS TO PRESSURIZE THE ANNULUS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTH OF SEPTEMBER WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	INDIANAPOLIS POWER & LIGHT
PLANT NAME	PETERSBURG
UNIT NUMBER	3
CITY	PETERSBURG
STATE	INDIANA
GROSS UNIT GENERATING CAPACITY - MW	532
NET UNIT GENERATING CAPACITY W/FGD - MW	515
EQUIVALENT SCRUBBED CAPACITY - MW	532

**** FUEL DATA**

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25004.	(10750 BTU/LB)
AVERAGE ASH CONTENT - %	********	
AVERAGE MOISTURE CONTENT - %	********	
AVERAGE SULFUR CONTENT - %	3.25	
AVERAGE CHLORIDE CONTENT %	********	

***** FGD SYSTEM**

**** GENERAL DATA**

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.30
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00
ENERGY CONSUMPTION - %	2.4
COMMERIAL START-UP DATE	12/77
INITIAL START-UP DATE	12/77
CONTRACT AWARDED	1/75

***** SLUDGE**

**** TREATMENT**

METHOD	FIXATION

**** DISPOSAL**

TYPE	LANDFILL

**** FGD SPARE CAPACITY INDICES**

ABSORBER - %	.0

**** FGD SPARE COMPONENT INDICES**

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			

**** PROBLEMS/SOLUTIONS/COMMENTS**

DURING JANUARY, ALL OF THE PACKING SPHERES WERE REMOVED FROM THE FOUR ABSORBER MODULES. THE SUPPORTING GRIDS WERE LEFT INTACT AND THE MODULES ARE BEING UTILIZED AS GRID TOWERS.

ALSO DURING JANUARY, REPAIRS TO FREEZE DAMAGED PIPING WERE COMPLETED. THE FRP RECLAIM WATER PIPING WAS RESET IN PLACES WHERE IT HAD PULLED APART AND THE WASTE SLURRY AND SLUDGE TREATMENT WATER LINES WERE THAWED. SOME PIPING GASKETS AND HEAT TRACING CIRCUITS WERE REPAIRED AND UPGRADED. IN ADDITION, SOME DRAIN VALVES WERE ADDED TO IMPROVE THE CAPABILITY TO DRAIN PIPING AND AVOID FUTURE FREEZE DAMAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM							672			
3/81	SYSTEM							744			

INDIANAPOLIS POWER & LIGHT: PETERSBURG 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER, PUMP REPAIRS INCLUDED REBUILDING THE CASING OF A MIST ELIMINATOR WASH PUMP, OVERHAULING A RECYCLE PUMP, AND REPAIRING ONE RECLAIM WATER PUMP AND MOTOR.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER, REMAINING PORTIONS OF THE FRP RECLAIM WATER PIPING WERE RESET AND ALIGNED.

SCALE FORMATION WAS REMOVED FROM ALL MIST ELIMINATOR ASSEMBLIES DURING THE SECOND QUARTER.

THE GUNNITE LINING IN THE PRESATURATOR DUCT SECTIONS OF THE FOUR ABSORBER MODULES WERE REPLACED DURING THE THREE MONTH PERIOD.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATIONAL INFORMATION FOR THE THIRD QUARTER 1981 IS NOT YET AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	KANSAS CITY POWER & LIGHT
PLANT NAME	HAWTHORN
UNIT NUMBER	3
CITY	KANSAS CITY
STATE	MISSOURI
GROSS UNIT GENERATING CAPACITY - MW	90
NET UNIT GENERATING CAPACITY W/FGD - MW	85
EQUIVALENT SCRUBBED CAPACITY - MW	90

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	22795.	(9800 BTU/LB)
AVERAGE ASH CONTENT - %	11.00	
AVERAGE MOISTURE CONTENT - %	********	
AVERAGE SULFUR CONTENT - %	.60	
AVERAGE CHLORIDE CONTENT - %	********	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	70.00
ENERGY CONSUMPTION - %	2.2
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	11/72
CONTRACT AWARDED	0/71

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	100.0	100.0	100.0	73.9			744	550	550	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE UNIT WAS SHUTDOWN FOR 194 HOURS DUE TO ECONOMIZER LEAKS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	84.8	100.0	66.5	30.0			672	202	202	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY APPROXIMATELY 101 HOURS OF OUTAGE TIME WAS CAUSED BY SUPERHEATER TUBE LEAKS.

THE BOILER DID NOT OPERATE 369 HOURS DUE TO A LACK OF DEMAND.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	52.2	100.0	100.0	52.2			744	388	388	

KANSAS CITY POWER & LIGHT: HAWTHORN 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

ECONOMIZER LEAKS AND HIGH VIBRATIONS OF THE ID FAN CAUSED 356 HOURS OF OUTAGE TIME DURING MARCH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	100.0	100.0	100.0	69.4			720	500	500	28.0
5/81	SYSTEM	100.0	100.0	100.0	31.0			744	231	231	20.0
6/81	SYSTEM	100.0	100.0	100.0	55.0			720	396	396	35.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981.

BOILER TUBE LEAKS WERE ENCOUNTERED DURING THE SECOND QUARTER CAUSING SYSTEM DOWN TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	100.0	100.0		51.9			744	386	386	23.7
8/81	SYSTEM	100.0	100.0		10.3			744	77	77	2.7
9/81	SYSTEM	100.0	100.0		57.8			720	416	416	24.0

** PROBLEMS/SOLUTIONS/COMMENTS

ALL UNIT OUTAGES DURING THE THIRD QUARTER WERE ATTRIBUTED TO A LACK OF DEMAND WITH THE EXCEPTION OF FOUR ECONOMIZER LEAKS IN SEPTEMBER THAT CAUSED A TOTAL OF 157 HOURS OF OUTAGE TIME.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	KANSAS CITY POWER & LIGHT
PLANT NAME	HAWTHORN
UNIT NUMBER	4
CITY	KANSAS CITY
STATE	MISSOURI
GROSS UNIT GENERATING CAPACITY - MW	90
NET UNIT GENERATING CAPACITY W/FGD - MW	85
EQUIVALENT SCRUBBED CAPACITY - MW	90

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	22795. (9800 BTU/LB)
AVERAGE ASH CONTENT - %	11.00
AVERAGE MOISTURE CONTENT - %	********
AVERAGE SULFUR CONTENT - %	.60
AVERAGE CHLORIDE CONTENT - %	********

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	70.00
ENERGY CONSUMPTION - %	2.2
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	8/72
CONTRACT AWARDED	0/71

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	100.0	100.0	100.0	66.7			744	498	498	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY A BREAKER FAILURE CAUSED BY A BROKEN LINKAGE CAUSED SOME OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	5.4	100.0	5.4	5.4			672	36	36	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE SYSTEM AND UNIT WERE OFF LINE FOR THE SPRING OVERHAUL. THE SYSTEM OPERATED A TOTAL OF 36 HOURS FOR THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	85.6	100.0	100.0	61.8			744	460	460	

KANSAS CITY POWER & LIGHT: HAWTHORN 4 (CONT.)

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-------------------------------------------PERFORMANCE DATA-------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
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      ** PROBLEMS/SOLUTIONS/COMMENTS

                            THE SPRING OVERHAUL WAS COMPLETED IN MARCH.  THIS ACCOUNTED FOR 107 HOURS
                            OF DOWN TIME.

                            DURING THE MONTH 177 HOURS OF OUTAGE TIME WAS CAUSED BY WATER WALL AND
                            SUPERHEATER LEAKS.

 4/81  SYSTEM     80.3        100.0        72.1         49.4                      720   356    356  24.0

      ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING APRIL THE SYSTEM WAS OUT OF SERVICE FOR 138 HOURS FOR CLEANING AND
                            GENERAL REPAIRS.

 5/81  SYSTEM     95.8        100.0        95.5         88.7                      744   660    660  64.0

      ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING MAY 31 HOURS OF OUTAGE TIME WERE ATTRIBUTED TO INLET DAMPER
                            REPAIRS.

 6/81  SYSTEM    100.0        100.0       100.0         94.5                      720   681    681  58.0

      ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING JUNE NO FGD-RELATED PROBLEMS WERE ENCOUNTERED.

 7/81  SYSTEM     96.0        100.0                     48.5                      744   361    361  26.0

      ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING JULY, 30 HOURS OF OUTAGE TIME WAS ATTRIBUTED TO A WATER WALL LEAK.

 8/81  SYSTEM    100.0        100.0                     18.3                      744   136    136   6.2

 9/81  SYSTEM    100.0        100.0                      3.3                      720    24     24    .0

      ** PROBLEMS/SOLUTIONS/COMMENTS

                            UNIT 4 WAS OUT OF SERVICE FOR MOST OF SEPTEMBER AS A RESULT OF A TURBINE
                            BEARING FAILURE.
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SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	KANSAS CITY POWER & LIGHT
PLANT NAME	LA CYGNE
UNIT NUMBER	1
CITY	LA CYGNE
STATE	KANSAS
GROSS UNIT GENERATING CAPACITY - MW	820
NET UNIT GENERATING CAPACITY W/FGD - MW	820
EQUIVALENT SCRUBBED CAPACITY - MW	820

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	21913. (9421 BTU/LB)
AVERAGE ASH CONTENT - %	24.36
AVERAGE MOISTURE CONTENT - %	8.60
AVERAGE SULFUR CONTENT - %	5.39
AVERAGE CHLORIDE CONTENT - %	.03

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	BABCOCK & WILCOX
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	2.9
COMMERIAL START-UP DATE	6/73
INITIAL START-UP DATE	2/73
CONTRACT AWARDED	3/71

*** SLUDGE

** TREATMENT

METHOD	BLEED

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	96.9	100.0	96.1	76.5						
	B	94.1	100.0	92.9	76.7						
	C	94.4	100.0	93.2	77.0						
	D	18.3	1.5	1.1	1.0						
	E	95.8	100.0	94.9	76.9						
	F	97.0	100.0	96.4	78.6						
	G	96.8	100.0	96.1	79.4						
	H	97.2	100.0	96.6	79.8						
	SYSTEM	86.6	100.0	83.3	68.3			744	465	508	62.5
2/81	A	99.6	100.0	99.4	72.0						
	B	99.3	100.0	98.8	68.0						
	C	99.4	99.7	99.1	65.2						
	D	99.3	100.0	99.0	72.9						
	E	99.1	93.1	98.5	60.9						
	F	99.1	92.9	98.6	60.7						

KANSAS CITY POWER & LIGHT: LA CYGNE 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	G	99.7	95.2	99.4	62.2						
	H	99.6	100.0	99.2	66.2						
	SYSTEM	99.4	100.0	99.1	66.1			672	439	444	47.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING PART OF JANUARY AND FEBRUARY MODULE D WAS OUT OF SERVICE FOR REPAIRS DUE TO FIRE DAMAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	97.2	100.0	96.9	86.9						
	B	97.7	96.5	97.3	82.1						
	C	95.6	100.0	95.1	85.8						
	D	96.8	96.1	96.2	81.2						
	E	97.2	98.4	96.7	83.7						
	F	97.8	89.8	97.3	76.5						
	G	97.3	93.3	96.7	79.4						
	H	97.7	87.3	97.0	74.3						
	SYSTEM	97.2	95.5	96.6	81.3			744	633	605	68.7

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO OTHER MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	97.4	97.3	94.5	45.7						
	B	97.5	98.2	94.9	46.1						
	C	97.1	97.3	94.0	45.7						
	D	97.2	97.6	94.0	45.8						
	E	97.4	97.3	94.5	45.7						
	F	97.4	97.6	94.3	45.8						
	G	97.4	97.6	94.6	45.8						
	H	97.1	96.7	94.0	45.4						
	SYSTEM	97.3	97.5	94.4	45.8			720	338	330	36.1
5/81	A	99.7	53.3	94.1	5.4						
	B	99.7	81.3	96.8	8.2						
	C	100.0	84.0	100.0	8.5						
	D	100.0	84.0	100.0	8.5						
	E	100.0	33.3	100.0	3.4						
	F	100.0	.0		.0						
	G	100.0	.0		.0						
	H	100.0	.0		.0						
	SYSTEM	99.9	42.0	98.2	4.3			744	75	32	12.6
6/81	A	99.7	100.0	98.6	19.6						
	B	99.3	100.0	96.5	19.2						
	C	99.0	100.0	94.3	16.0						
	D	99.2	100.0	95.8	19.0						
	E	79.4	20.2	12.9	3.1						
	F	99.6	100.0	97.9	19.3						
	G	99.9	20.6	95.8	3.2						
	H	100.0	.0		.0						
	SYSTEM	97.0	67.6	84.5	12.4			720	109	89	4.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE, MODULE E WAS UNAVAILABLE FOR 572 HOURS AS A RESULT OF PROBLEMS ENCOUNTERED WITH THE VENTURI PUMP MOTOR.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	96.9	95.8	95.4	64.2						
	B	97.2	93.0	95.7	62.4						
	C	97.4	73.9	95.1	49.6						
	D	96.0	89.4	93.7	59.9						

EPA UTILITY FGD SURVEY: JULY - SEPTEMBER 1981

KANSAS CITY POWER & LIGHT: LA CYGNE 1 (CONT.)

		PERFORMANCE DATA									
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	E	96.1	82.2	93.4	55.1						
	F	98.0	69.1	95.8	46.4						
	G	97.2	75.8	95.0	50.8						
	H	97.8	50.5	95.0	40.6						
	SYSTEM	97.1	80.0	94.9	53.6			744	499	399	37.0
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTHS OF AUGUST AND SEPTEMBER WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	KANSAS POWER & LIGHT
PLANT NAME	JEFFREY
UNIT NUMBER	1
CITY	WAMEGO
STATE	KANSAS
GROSS UNIT GENERATING CAPACITY - MW	720
NET UNIT GENERATING CAPACITY W/FGD - MW	680
EQUIVALENT SCRUBBED CAPACITY - MW	540
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	******
AVERAGE HEAT CONTENT - J/G	18899. (8125 BTU/LB)
AVERAGE ASH CONTENT - %	5.80
AVERAGE MOISTURE CONTENT - %	28.00
AVERAGE SULFUR CONTENT - %	.32
AVERAGE CHLORIDE CONTENT - %	.01
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	60.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	8/78
CONTRACT AWARDED	7/73
*** SLUDGE	
** TREATMENT	
METHOD	STABILIZATION
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	20.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS NOT OPERATED MUCH DURING THE FIRST QUARTER OF 1981 BECAUSE THE UTILITY WAS ABLE TO MEET COMPLIANCE USING ONLY LOW SULFUR COAL.

DURING THE MONTH OF MARCH THE SYSTEM WAS DOWN FOR A PERIOD OF TWO WEEKS DUE TO A SCHEDULED MAINTENANCE OUTAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			

EPA UTILITY FGD SURVEY: JULY - SEPTEMBER 1981

KANSAS POWER & LIGHT: JEFFREY 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE JEFFREY 1 FGD SYSTEM OPERATED INTERMITTENTLY DURING THE SECOND AND THIRD QUARTERS OF 1981 AS A RESULT OF THE LOW SULFUR CONTENT OF THE COAL.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	KANSAS POWER & LIGHT
PLANT NAME	JEFFREY
UNIT NUMBER	2
CITY	WAMEGO
STATE	KANSAS
GROSS UNIT GENERATING CAPACITY - MW	700
NET UNIT GENERATING CAPACITY W/FGD - MW	680
EQUIVALENT SCRUBBED CAPACITY - MW	490

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	18841.	(8100 BTU/LB)
AVERAGE ASH CONTENT - %	5.80	
AVERAGE MOISTURE CONTENT - %	28.00	
AVERAGE SULFUR CONTENT - %	.30	
AVERAGE CHLORIDE CONTENT - %	********	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	********
SO2 DESIGN REMOVAL EFFICIENCY - %	60.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	5/80
INITIAL START-UP DATE	1/80
CONTRACT AWARDED	7/73

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	20.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS NOT OPERATED MUCH DURING THE FIRST QUARTER OF 1981 BECAUSE THE UTILITY WAS ABLE TO MEET COMPLIANCE USING ONLY LOW SULFUR COAL.

THE UNIT WAS SHUT DOWN ALL OF MARCH AND PART OF FEBRUARY (SIX WEEKS) FOR AN EQUIPMENT WARRANTY INSPECTION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE JEFFREY 2 FGD SYSTEM OPERATED INTERMITTENTLY DURING THE SECOND AND THIRD QUARTERS OF 1981 AS A RESULT OF THE LOW SULFUR CONTENT OF THE COAL.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	KANSAS POWER & LIGHT
PLANT NAME	LAWRENCE
UNIT NUMBER	4
CITY	LAWRENCE
STATE	KANSAS
GROSS UNIT GENERATING CAPACITY - MW	125
NET UNIT GENERATING CAPACITY W/FGD - MW	115
EQUIVALENT SCRUBBED CAPACITY - MW	125

**** FUEL DATA**

FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
AVERAGE ASH CONTENT - %	9.80	
AVERAGE MOISTURE CONTENT - %	12.00	
AVERAGE SULFUR CONTENT - %	.55	
AVERAGE CHLORIDE CONTENT - %	.03	

***** FGD SYSTEM**

**** GENERAL DATA**

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	98.90
SO2 DESIGN REMOVAL EFFICIENCY - %	73.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	1/77
CONTRACT AWARDED	12/68

***** SLUDGE**

**** TREATMENT**

METHOD	FORCED OXIDATION

**** DISPOSAL**

TYPE	POND

**** FGD SPARE CAPACITY INDICES**

ABSORBER - %	.0

**** FGD SPARE COMPONENT INDICES**

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

**** PROBLEMS/SOLUTIONS/COMMENTS**

LAWRENCE 4 WAS ON COLD STANDBY MUCH OF THE JANUARY-MARCH PERIOD AND THEREFORE DID NOT SEE MUCH OPERATION. UTILITY REPORTED THERE WERE NO FGD SYSTEM RELATED OUTAGES DURING THE QUARTER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

KANSAS POWER & LIGHT: LAWRENCE 4 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH OF SEPTEMBER, LAWRENCE 4 WAS ON COLD STANDBY FROM THE THIRD TO THE TWENTY FIRST. NO FGD SYSTEM RELATED PROBLEMS WERE REPORTED FOR THIS UNIT DURING THE SECOND AND THIRD QUARTERS OF 1981.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	KANSAS POWER & LIGHT	
PLANT NAME	LAWRENCE	
UNIT NUMBER	5	
CITY	LAWRENCE	
STATE	KANSAS	
GROSS UNIT GENERATING CAPACITY - MW	420	
NET UNIT GENERATING CAPACITY W/FGD - MW	400	
EQUIVALENT SCRUBBED CAPACITY - MW	420	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	23260.	(10000 BTU/LB)
AVERAGE ASH CONTENT - %	9.80	
AVERAGE MOISTURE CONTENT - %	12.00	
AVERAGE SULFUR CONTENT - %	.55	
AVERAGE CHLORIDE CONTENT %	.03	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	COMBUSTION ENGINEERING	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	98.90	
SO2 DESIGN REMOVAL EFFICIENCY - %	52.00	
ENERGY CONSUMPTION - %	*******	
COMMERIAL START-UP DATE	**/**	
INITIAL START-UP DATE	4/78	
CONTRACT AWARDED	9/69	
*** SLUDGE		
** TREATMENT		
METHOD	FORCED OXIDATION	
** DISPOSAL		
TYPE	POND	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

UTILITY REPORTED THAT NO FGD RELATED OUTAGES OCCURRED THROUGHOUT THE FIRST QUARTER OF 1981.

THE UNIT WAS SHUT DOWN FOR 17-HOURS IN MARCH DUE TO A SUPERHEATER FAILURE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			

KANSAS POWER & LIGHT: LAWRENCE 5 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM							720			
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

LAWRENCE 5 WAS REPORTED TO BE AVAILABLE 100% OF THE TIME DURING THE THIRD QUARTER 1981. NO FGD SYSTEM RELATED PROBLEMS WERE REPORTED FOR EITHER THE SECOND OR THIRD QUARTERS.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	KENTUCKY UTILITIES
PLANT NAME	GREEN RIVER
UNIT NUMBER	1-3
CITY	CENTRAL CITY
STATE	KENTUCKY
GROSS UNIT GENERATING CAPACITY - MW	64
NET UNIT GENERATING CAPACITY W/FGD - MW	60
EQUIVALENT SCRUBBED CAPACITY - MW	64

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25586.	(11000 BTU/LB)
AVERAGE ASH CONTENT - %	13.40	
AVERAGE MOISTURE CONTENT - %	12.10	
AVERAGE SULFUR CONTENT - %	4.00	
AVERAGE CHLORIDE CONTENT - %	********	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	AMERICAN AIR FILTER
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	3.1
COMMERIAL START-UP DATE	6/76
INITIAL START-UP DATE	9/75
CONTRACT AWARDED	6/73

*** SLUDGE

** TREATMENT

METHOD	BLEED

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	100.0			.0			744	0	0	.0
2/81	SYSTEM	100.0			.0			672	0	0	.0
3/81	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH AN ATTEMPT TO RUN A FULL LOAD COMPLIANCE TEST FAILED DUE TO BLOWN INSULATORS. THE UTILITY IS PRESENTLY WAITING ON NEW INSULATORS.

THE FGD SYSTEM WAS AVAILABLE 100% OF THE TIME DURING THE FIRST QUARTER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	100.0			.0			720	0	0	.0
5/81	SYSTEM	100.0			.0			744	0	0	.0
6/81	SYSTEM	100.0			.0			720	0	0	.0

EPA UTILITY FGD SURVEY: JULY - SEPTEMBER 1981

KENTUCKY UTILITIES: GREEN RIVER 1-3 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM DID NOT OPERATE DURING THE SECOND QUARTER 1981. THE UTILITY IS WAITING FOR NEW GENERATOR TERMINAL LEADS. THE FGD SYSTEM WAS AVAILABLE, HOWEVER, FOR OPERATION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	100.0			.0			744	0	0	.0
8/81	SYSTEM	100.0			.0			744	0	0	.0
9/81	SYSTEM	100.0			.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE GREEN RIVER UNITS 1-3 REMAINED OFF LINE DURING THE SECOND QUARTER 1981. THE FGD SYSTEM WAS AVAILABLE FOR OPERATION BUT WAS NOT NEEDED.

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COMPANY NAME                                  LOUISVILLE GAS & ELECTRIC
PLANT NAME                                    CANE RUN
UNIT NUMBER                                   4
CITY                                          LOUISVILLE
STATE                                         KENTUCKY
GROSS UNIT GENERATING CAPACITY - MW             188
NET UNIT GENERATING CAPACITY W/FGD - MW         175
EQUIVALENT SCRUBBED CAPACITY - MW               188

 ** FUEL DATA
     FUEL TYPE                                COAL
     FUEL GRADE                               BITUMINOUS
     AVERAGE HEAT CONTENT - J/G                26749.         ( 11500 BTU/LB)
     AVERAGE ASH CONTENT - %                     17.10
     AVERAGE MOISTURE CONTENT - %                 9.00
     AVERAGE SULFUR CONTENT - %                   3.75
     AVERAGE CHLORIDE CONTENT - %                  .04

*** FGD SYSTEM

 ** GENERAL DATA
     PROCESS TYPE                             LIME
     SYSTEM SUPPLIER                          AMERICAN AIR FILTER
     NEW/RETROFIT                             RETROFIT
     PARTICULATE DESIGN REMOVAL EFFICIENCY - %   99.00
     SO2 DESIGN REMOVAL EFFICIENCY - %           85.00
     ENERGY CONSUMPTION - %                       1.6
     COMMERIAL START-UP DATE                   8/77
     INITIAL START-UP DATE                     8/76
     CONTRACT AWARDED                          4/74

*** SLUDGE

 ** TREATMENT
     METHOD                                   FIXATION

 ** DISPOSAL
     TYPE                                     LANDFILL

 ** FGD SPARE CAPACITY INDICES
     ABSORBER - %                                  .0

 ** FGD SPARE COMPONENT INDICES
     ABSORBER                                      .0


-------------------------------------------PERFORMANCE DATA---------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 1/81  SYSTEM      81.0        81.0        81.0        81.0                 744   744    604  35.0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                          DURING JANUARY THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY 140 HOURS
                          DUE TO A LACK OF AVAILABLE LIME.

 2/81  SYSTEM        .0          .0          .0          .0                 672   268      0  35.0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                          DURING FEBRUARY THE FGD SYSTEM WAS NOT AVAILABLE DUE TO MIST ELIMINATOR
                          AND DUCTWORK PROBLEMS.

 3/81  SYSTEM     100.0       100.0       100.0        39.0                 744   290    290  35.0
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LOUISVILLE GAS & ELECTRIC: CANE RUN 4 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	100.0			.0			720	0	0	.0
5/81	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTHS OF APRIL AND MAY THE UNIT DID NOT OPERATE. HOWEVER, THE FGD SYSTEM WAS AVAILABLE 100%.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM	84.2	80.4	80.4	63.6			720	570	458	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH OF JUNE THE PUMP PIT WAS SUBMERGED IN SLURRY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	72.6	100.0	100.0	72.6			744	540	540	
8/81	SYSTEM	39.9	65.9	65.9	39.9			744	451	297	
9/81	SYSTEM	60.8	100.0	100.0	60.8			720	438	438	

** PROBLEMS/SOLUTIONS/COMMENTS

ABSORBER MODULE PLUGGING ACCOUNTED FOR THE MAJORITY OF THE FGD SYSTEM OUTAGE TIME DURING THE THREE MONTH PERIOD.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	LOUISVILLE GAS & ELECTRIC	
PLANT NAME	CANE RUN	
UNIT NUMBER	5	
CITY	LOUISVILLE	
STATE	KENTUCKY	
GROSS UNIT GENERATING CAPACITY - MW	200	
NET UNIT GENERATING CAPACITY W/FGD - MW	192	
EQUIVALENT SCRUBBED CAPACITY - MW	200	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
AVERAGE ASH CONTENT - %	13.90	
AVERAGE MOISTURE CONTENT - %	9.00	
AVERAGE SULFUR CONTENT - %	3.75	
AVERAGE CHLORIDE CONTENT - %	.04	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	COMBUSTION ENGINEERING	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00	
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00	
ENERGY CONSUMPTION - %	1.5	
COMMERIAL START-UP DATE	7/78	
INITIAL START-UP DATE	12/77	
CONTRACT AWARDED	4/75	
*** SLUDGE		
** TREATMENT		
METHOD	FIXATION	
** DISPOSAL		
TYPE	LANDFILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	100.0	99.7	99.7	89.4			744	667	665	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	82.0	77.0	77.0	59.0			672	512	394	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY SOME OUTAGE TIME WAS DUE TO FAN PROBLEMS.

ADDITIONAL PROBLEMS WERE ENCOUNTERED DUE TO REHEATER LEAKS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	100.0	46.0	46.0	43.0			744	698	319	50.0

EPA UTILITY FGD SURVEY: JULY - SEPTEMBER 1981

LOUISVILLE GAS & ELECTRIC: CANE RUN 5 (CONT.)

PERFORMANCE DATA											
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

OUTAGE TIME DURING MARCH WAS DUE TO STRIKING WORKERS AT THE PLANT.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	100.0	100.0	100.0	51.0			720	367	367	40.0
5/81	SYSTEM	100.0	95.9	95.9	92.3			744	716	687	45.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE MONTHS OF APRIL AND MAY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM	100.0			.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH OF JUNE THE BOILER DID NOT OPERATE; HOWEVER, THE FGD SYSTEM WAS AVAILABLE 100%.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	45.6	100.0	100.0	45.6			744	339	339	50.0
8/81	SYSTEM	49.5	100.0	100.0	49.5			744	368	368	45.0
9/81	SYSTEM	75.0	100.0	100.0	75.0			720	540	540	45.0

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO MAJOR FGD RELATED PROBLEMS REPORTED FOR THE THIRD QUARTER 1981.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	LOUISVILLE GAS & ELECTRIC	
PLANT NAME	CANE RUN	
UNIT NUMBER	6	
CITY	LOUISVILLE	
STATE	KENTUCKY	
GROSS UNIT GENERATING CAPACITY - MW	299	
NET UNIT GENERATING CAPACITY W/FGD - MW	277	
EQUIVALENT SCRUBBED CAPACITY - MW	299	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25586.	(11000 BTU/LB)
AVERAGE ASH CONTENT - %	17.06	
AVERAGE MOISTURE CONTENT - %	8.95	
AVERAGE SULFUR CONTENT - %	4.80	
AVERAGE CHLORIDE CONTENT - %	.04	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	DUAL ALKALI	
SYSTEM SUPPLIER	THYSSEN/CEA	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00	
SO2 DESIGN REMOVAL EFFICIENCY - %	95.00	
ENERGY CONSUMPTION - %	1.0	
COMMERIAL START-UP DATE	**/**	
INITIAL START-UP DATE	4/79	
CONTRACT AWARDED	10/76	
*** SLUDGE		
** TREATMENT		
METHOD	FIXATION	
** DISPOSAL		
TYPE	LANDFILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	20.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.3	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	85.7	83.3	83.3	80.2			744	716	597	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY PROBLEMS WITH THE THICKENER RACK SHAFT CONTINUED TO CAUSE OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	99.6	99.5	99.5	71.6			672	483	481	45.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	99.6	34.2	34.2	28.0			744	607	208	50.0

LOUISVILLE GAS & ELECTRIC: CANE RUN 6 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS DURING MARCH OUTAGE TIME WAS DUE TO STRIKING WORKERS AT THE PLANT.										
4/81	SYSTEM	95.0	98.5	100.0	82.6			720	604	595	45.0
5/81	SYSTEM	96.8	96.9	100.0	96.8			744	243	720	55.0
6/81	SYSTEM	88.9	100.0	100.0	26.5			720	191	191	45.0
	** PROBLEMS/SOLUTIONS/COMMENTS THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981.										
7/81	SYSTEM	74.0	69.0	69.0	57.0			744	615	424	
8/81	SYSTEM	80.0	73.0	77.0	68.0			744	693	506	
9/81	SYSTEM	100.0	98.0	98.0	22.0			720	162	158	
	** PROBLEMS/SOLUTIONS/COMMENTS RUPTURE OF THE FRP THICKENER AND ABSORBER BLEED PIPE CAUSED PROBLEMS DURING THE THIRD QUARTER 1981. THE UNIT IS EXPECTED TO BE REMOVED FROM SERVICE IN OCTOBER FOR A THREE MONTH TURBINE OVERHAUL.										

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	LOUISVILLE GAS & ELECTRIC	
PLANT NAME	MILL CREEK	
UNIT NUMBER	1	
CITY	LOUISVILLE	
STATE	KENTUCKY	
GROSS UNIT GENERATING CAPACITY - MW	358	
NET UNIT GENERATING CAPACITY W/FGD - MW	334	
EQUIVALENT SCRUBBED CAPACITY - MW	358	

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
AVERAGE ASH CONTENT - %	14.50	
AVERAGE MOISTURE CONTENT - %	9.00	
AVERAGE SULFUR CONTENT - %	3.75	
AVERAGE CHLORIDE CONTENT - %	.04	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00
ENERGY CONSUMPTION - %	1.4
COMMERIAL START-UP DATE	4/81
INITIAL START-UP DATE	12/80
CONTRACT AWARDED	11/77

*** SLUDGE

** TREATMENT

METHOD	FIXATION

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	51.0	46.0	46.0	42.0			744	675	312	45.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY A BROKEN BLEED PUMP DISCHARGE LINES CAUSE APPROXIMATELY 363 HOURS OF OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	51.5	51.5	51.5	51.5			672	346	346	50.0
3/81	SYSTEM	39.0	36.0	36.0	35.0			744	712	258	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY AND MARCH PROBLEMS WERE ENCOUNTERED DUE TO THE THICKENER PLUGGING.

ADDITIONAL OUTAGE TIME DURING MARCH WAS DUE TO STRIKING WORKERS AT THE

LOUISVILLE GAS & ELECTRIC: MILL CREEK 1 (CONT.)

PERFORMANCE DATA

PLANT.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	39.9	25.2	25.2	7.9			720	226	57	25.0
5/81	SYSTEM	46.9	60.7	60.7	21.8			744	267	162	35.0
6/81	SYSTEM	56.1	33.9	33.9	26.5			720	563	191	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER 1981 THE UTILITY REPORTED HAVING PROBLEMS WITH THE GLYCOL STEAM REHEAT HEAT EXCHANGER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	76.3	75.3	75.3	72.2			744	713	537	65.0
8/81	SYSTEM	99.2	99.2	99.2	98.7			744	740	734	65.0
9/81	SYSTEM	85.7	95.5	95.5	79.6			720	600	573	60.0

** PROBLEMS/SOLUTIONS/COMMENTS

ALL FGD SYSTEM DOWNTIME DURING THE THIRD QUARTER 1981 WAS ATTRIBUTED TO PROBLEMS WITH THE GLYCOL/WATER HEAT EXCHANGER ON THE REHEAT SYSTEM.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	LOUISVILLE GAS & ELECTRIC
PLANT NAME	MILL CREEK
UNIT NUMBER	3
CITY	LOUISVILLE
STATE	KENTUCKY
GROSS UNIT GENERATING CAPACITY - MW	427
NET UNIT GENERATING CAPACITY W/FGD - MW	420
EQUIVALENT SCRUBBED CAPACITY - MW	427
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	26749. (11500 BTU/LB)
AVERAGE ASH CONTENT - %	15.00
AVERAGE MOISTURE CONTENT - %	10.00
AVERAGE SULFUR CONTENT - %	3.75
AVERAGE CHLORIDE CONTENT - %	.04
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIME
SYSTEM SUPPLIER	AMERICAN AIR FILTER
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	3/79
INITIAL START-UP DATE	8/78
CONTRACT AWARDED	11/75
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	.0	.0	.0	.0			744	521	0	40.0
2/81	SYSTEM	.0	.0	.0	.0			672	593	0	50.0
3/81	SYSTEM	1.0	1.0	1.0	1.0			744	675	8	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 MAJOR CORROSION DAMAGE CAUSED FAILURE OF THE PRECRETE-G.

FROZEN LINES ENCOUNTERED DURING THE PERIOD ACCOUNTED FOR SOME OUTAGE TIME.

REPAIRS TO THE MIST ELIMINATOR SHELL CAUSED ADDITIONAL OUTAGE TIME.

DURING MARCH STRIKING WORKERS ADDED TO THE OUTAGE TIME OF THE SYSTEM.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	32.9	33.2	33.2	32.9			720	714	237	45.0

LOUISVILLE GAS & ELECTRIC: MILL CREEK 3 (CONT.)

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-------------------------------------------PERFORMANCE DATA-------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2   PART. HOURS HOURS  HOURS FACTOR
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       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING THE MONTH OF APRIL THE UTILITY REPORTED HAVING PROBLEMS WITH FROZEN
                           PIPELINE FAILURES.

 5/81  SYSTEM     33.7         37.9        37.9        33.7                     744   662    251  55.0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING THE MONTH OF MAY THE UTILITY REPORTED HAVING PROBLEMS WITH
                           THE THICKENER.

 6/81  SYSTEM     34.6         34.6        34.6        34.6                     720   719    249

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING THE MONTH OF JUNE THE UTILITY REPORTED HAVING MODULE CORROSION
                           PROBLEMS.

 7/81  SYSTEM     63.4         73.6        73.6        63.4                     744   641    472  60.0

 8/81  SYSTEM     89.2         91.8        91.8        88.3                     744   716    657  65.0

 9/81  SYSTEM     80.8         80.8        80.8        80.8                     720   720    582  65.0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           MIST ELIMINATOR MODULE FAILURES WERE ENCOUNTERED DURING THE THIRD QUARTER
                           1981.
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SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	LOUISVILLE GAS & ELECTRIC
PLANT NAME	PADDY'S RUN
UNIT NUMBER	6
CITY	LOUISVILLE
STATE	KENTUCKY
GROSS UNIT GENERATING CAPACITY - MW	72
NET UNIT GENERATING CAPACITY W/FGD - MW	67
EQUIVALENT SCRUBBED CAPACITY - MW	72

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
AVERAGE ASH CONTENT - %	11.50	
AVERAGE MOISTURE CONTENT - %	********	
AVERAGE SULFUR CONTENT - %	2.50	
AVERAGE CHLORIDE CONTENT - %	********	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.10
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	2.8
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	4/73
CONTRACT AWARDED	7/71

*** SLUDGE

** TREATMENT

METHOD	FIXATION

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	100.0			.0			744	0	0	.0
2/81	SYSTEM	100.0			.0			672	0	0	.0
3/81	SYSTEM	100.0			.0			744	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UNIT WAS NOT OPERATED DUE TO THE LACK OF DEMAND.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	100.0			.0			720	0	0	.0
5/81	SYSTEM	100.0			.0			744	0	0	.0
6/81	SYSTEM	100.0			.0			720	0	0	.0

LOUISVILLE GAS & ELECTRIC: PADDY'S RUN 6 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THROUGHOUT THE SECOND QUARTER 1981 THE BOILER DID NOT OPERATE; HOWEVER, THE FGD SYSTEM WAS AVAILABLE 100%.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	100.0			.0			744	0	0	.0
8/81	SYSTEM	100.0			.0			744	0	0	.0
9/81	SYSTEM	100.0			.0			720	0	0	.0

** PROBLEMS/SOLUTIONS/COMMENTS

PADDY'S RUN UNIT 6 REMAINED OFF LINE DURING THE THIRD QUARTER 1981.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MINNESOTA POWER & LIGHT
PLANT NAME	CLAY BOSWELL
UNIT NUMBER	4
CITY	COHASSET
STATE	MINNESOTA
GROSS UNIT GENERATING CAPACITY - MW	554
NET UNIT GENERATING CAPACITY W/FGD - MW	504
EQUIVALENT SCRUBBED CAPACITY - MW	475
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	19276. (8287 BTU/LB)
AVERAGE ASH CONTENT - %	9.40
AVERAGE MOISTURE CONTENT - %	24.50
AVERAGE SULFUR CONTENT - %	.94
AVERAGE CHLORIDE CONTENT - %	.01
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIME/ALKALINE FLYASH
SYSTEM SUPPLIER	PEABODY PROCESS SYSTEMS
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.73
SO2 DESIGN REMOVAL EFFICIENCY - %	84.55
ENERGY CONSUMPTION - %	1.3
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	4/80
CONTRACT AWARDED	**/**
*** SLUDGE	
** TREATMENT	
METHOD	BLEED
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	33.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	1	100.0	100.0	100.0	100.0						
	2	69.4	48.1	100.0	48.1						
	3	100.0	98.4	100.0	98.4						
	4	73 .	38.7	100.0	38.7						
	SYSTEM	100.0	95.0	100.0	95.0			744	744	707	93.0
2/81	1	100.0	92.2	100.0	91.5						
	2	62.1	36.4	100.0	36.2						
	3	75.7	48.9	100.0	48.5						
	4	100.0	67.8	100.0	67.3						
	SYSTEM	100.0	81.7	100.0	81.1			672	667	545	86.0
3/81	1	79.8	55.6	100.0	53.2						
	2	40.2	29.5	100.0	28.2						
	3	100.0	94.8	100.0	90.7						
	4	100.0	95.8	100.0	91.7						
	SYSTEM	100.0	91.8	100.0	87.9			744	712	654	88.9

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	1	54.3	28.2	100.0	26.3						
	2	88.1	70.5	100.0	65.7						
	3	94.0	56.7	100.0	52.8						
	4	100.0	88.1	100.0	82.1						
	SYSTEM	100.0	81.1	100.0	75.6			720	671	545	83.5
5/81	1	95.2	51.2	100.0	46.8						
	2	95.3	75.2	100.0	67.7						
	3	98.0	66.0	100.0	59.5						
	4	.0	.0		.0						
	SYSTEM	96.1	64.3	100.0	58.0			744	671	432	63.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MODULE 4 WAS DOWN FOR AN INSPECTION, MAINTENANCE AND VENTURI MODIFICATIONS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	1	100.0	71.6	100.0	71.6						
	2	96.1	74.9	100.0	74.9						
	3	94.0	78.3	100.0	78.3						
	4	33.5	31.7	100.0	31.7						
	SYSTEM	100.0	85.5	100.0	85.5			720	720	616	89.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR PROBLEMS WERE ENCOUNTERED DURING THE MONTH OF JUNE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	1	66.5	56.2	100.0	49.2						
	2	100.0	93.9	100.0	82.1						
	3	100.0	78.8	100.0	69.0						
	4	79.0	29.5	100.0	25.8						
	SYSTEM	100.0	86.1	100.0	75.4			744	651	561	78.0
8/81	1	27.3	9.3	100.0	8.3						
	2	100.0	100.0	100.0	91.5						
	3	78.5	31.3	100.0	28.0						
	4	100.0	100.0	100.0	91.5						
	SYSTEM	100.0	80.2	100.0	73.1			744	665	544	73.8
9/81	1	100.0	60.0	100.0	56.8						
	2	100.0	100.0	100.0	95.4						
	3	58.2	41.8	100.0	39.6						
	4	66.7	65.0	100.0	61.5						
	SYSTEM	100.0	88.9	100.0	84.4			720	682	608	87.8

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO MAJOR FGD RELATED PROBLEMS REPORTED FOR THE THIRD QUARTER 1981.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MINNKOTA POWER
PLANT NAME	MILTON R. YOUNG
UNIT NUMBER	2
CITY	CENTER
STATE	NORTH DAKOTA
GROSS UNIT GENERATING CAPACITY - MW	440
NET UNIT GENERATING CAPACITY W/FGD - MW	402
EQUIVALENT SCRUBBED CAPACITY - MW	185

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	15119.	(6500 BTU/LB)
AVERAGE ASH CONTENT - %	6.50	
AVERAGE MOISTURE CONTENT - %	38.00	
AVERAGE SULFUR CONTENT - %	.70	
AVERAGE CHLORIDE CONTENT - %	.01	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME/ALKALINE FLYASH
SYSTEM SUPPLIER	THYSSEN/CEA
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.60
SO2 DESIGN REMOVAL EFFICIENCY - %	36.13
ENERGY CONSUMPTION - %	1.6
COMMERIAL START-UP DATE	6/78
INITIAL START-UP DATE	9/77
CONTRACT AWARDED	4/75

*** SLUDGE

** TREATMENT

METHOD	DEWATERED

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	100.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	83.8	94.4	100.0	83.9						
	B	.0	.0		.0						
	SYSTEM	83.9	94.4	100.0	83.9			744	661	624	83.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE SYSTEM WAS SHUT DOWN FOR PART OF THE MONTH TO REPACK THE ABSORBER TOWER AGITATOR.

ADDITIONAL OUTAGE TIME WAS DUE TO ISOLATION DAMPER PROBLEMS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	33.9	11.8	100.0	11.8						
	B	83.3	87.4	100.0	83.3						
	SYSTEM	95.0	99.8	100.0	95.0			672	641	639	88.5

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	58.3	66.3	100.0	58.3						
	B	29.6	28.4	100.0	25.0						
	SYSTEM	87.8	94.6	100.0	83.8			744	655	620	78.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH SOME OUTAGE TIME WAS DUE TO ISOLATION DAMPER PROBLEMS.

BOOSTER FAN PROBLEMS CAUSED ADDITIONAL DOWN TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	.0	.0	.0	.0						
	B	2.7	5.4	5.6	2.7						
	SYSTEM	2.7	5.4	5.6	2.7			720	360	20	78.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE MIST ELIMINATOR PLUGGED CAUSING SYSTEM DOWN TIME.

PROBLEMS WERE ENCOUNTERED WITH THE BOOSTER FAN.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	A	65.4	73.3	75.0	65.4						
	B	.0	.0	.0	.0						
	SYSTEM	65.4	73.3	75.0	65.4			744	661	487	80.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MODULE A EXPERIENCED BOOSTER FAN PROBLEMS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	A	72.3	66.3	68.2	52.6						
	B	.0	.0	.0	.0						
	SYSTEM	72.3	66.3	68.2	52.6			720	571	379	77.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE MODULE B WAS OUT OF SERVICE FOR MAINTENANCE. MAINTENANCE WAS PERFORMED ON THE SPRAY NOZZLES, MIST ELIMINATOR, TRAY UNDERSPRAY STRAINER, ISOLATION DAMPER, AND THE FLAKE LINING.

MODULE B SPRAY RECYCLE NOZZLES WERE CLEANED AND THE WASH TRAY HEADER WAS CHECKED FOR PLUGGING.

THE RECYCLE TANK TRAY ON MODULE A WAS CLEANED DURING JUNE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	28.8	32.1	33.3	28.8						
	B	.0	.0	.0	.0						
	SYSTEM	28.8	32.1	33.3	28.8			744	666	214	82.9

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS REMOVED FROM SERVICE ON JULY 10 WHEN THE THICKENER RAKE DRIVE BROKE. THIS CAUSED THE MODULE TO REMAIN OUT OF SERVICE THE REST OF THE MONTH.

DURING THE MONTH, THE FLAKE LINING WAS BEING REPAIRED ON MODULE B.

NEW MIST ELIMINATORS WERE INSTALLED IN MODULE B DURING JULY.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	A	.0	.0	.0	.0						

MINNKOTA POWER: MILTON R. YOUNG 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	58.1	48.6	49.5	44.2						
	SYSTEM	58.1	48.6	49.5	44.2			744	677	329	79.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING AUGUST, MODULE A WAS OFF LINE AWAITING FAN BLADES AND REPAIRS TO THE ABSORBER TOWER.

MODULE B WAS DOWN FOR PART OF THE MONTH AS REPAIRS CONTINUED TO THE THICKENER RAKE DRIVE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	A	.0	.0	.0	.0						
	B	100.0	97.2	100.0	85.8						
	SYSTEM	100.0	97.2	100.0	85.8			720	636	618	83.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS DOWN TWICE DURING THE MONTH AS A RESULT OF BOILER TUBE LEAKS.

THE A MODULE REMAINED DOWN DURING THE MONTH FOR REPAIRS.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MONONGAHELA POWER
PLANT NAME	PLEASANTS
UNIT NUMBER	1
CITY	WILLOW ISLAND
STATE	WEST VIRGINIA
GROSS UNIT GENERATING CAPACITY - MW	618
NET UNIT GENERATING CAPACITY W/FGD - MW	580
EQUIVALENT SCRUBBED CAPACITY - MW	618
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	27912. (12000 BTU/LB)
AVERAGE ASH CONTENT - %	13.50
AVERAGE MOISTURE CONTENT - %	4.50
AVERAGE SULFUR CONTENT - %	3.00
AVERAGE CHLORIDE CONTENT - %	********
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIME
SYSTEM SUPPLIER	BABCOCK & WILCOX
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.55
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	3/79
INITIAL START-UP DATE	3/79
CONTRACT AWARDED	9/75
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	33.3
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			86.2
2/81	SYSTEM							672			81.0
3/81	SYSTEM							744			33.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING AN FGD SYSTEM OUTAGE IN MARCH IT WAS DISCOVERED THAT THE PLASITE LINING IN THE OUTLET DUCTWORK FOR MODULES B AND D WAS FAILING. THE B MODULE DUCTWORK WAS PATCHED AND THE MODULE RETURNED TO SERVICE. THE D MODULE WAS KEPT OFF LINE AND THE OUTLET DUCTWORK FOR THIS MODULE WILL BE RELINED WITH CHLOROBUTYL RUBBER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			

MONONGAHELA POWER: PLEASANTS 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MONONGAHELA POWER
PLANT NAME	PLEASANTS
UNIT NUMBER	2
CITY	WILLOW ISLAND
STATE	WEST VIRGINIA
GROSS UNIT GENERATING CAPACITY - MW	618
NET UNIT GENERATING CAPACITY W/FGD - MW	580
EQUIVALENT SCRUBBED CAPACITY - MW	618

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27912.	(12000 BTU/LB)
AVERAGE ASH CONTENT - %	13.50	
AVERAGE MOISTURE CONTENT - %	4.50	
AVERAGE SULFUR CONTENT - %	3.00	
AVERAGE CHLORIDE CONTENT - %	********	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	BABCOCK & WILCOX
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.55
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	12/80
INITIAL START-UP DATE	10/80
CONTRACT AWARDED	9/75

*** SLUDGE

** TREATMENT

METHOD	FIXATION

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	33.3

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			60.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY IT WAS NECESSARY TO CLEAN THE SOLIDS OUT OF THE THICKENER OVERFLOW TANK AS A RESULT OF PROBLEMS WITH THE DENSITY CONTROL.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM							672			50.0

** PROBLEMS/SOLUTIONS/COMMENTS

A NINE-FOOT SECTION OF PIPE HAD TO BE RELINED DURING THE MONTH ON MODULE B AS A RESULT OF FAILURE OF THE RUBBER LINER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			72.0

MONONGAHELA POWER: PLEASANTS 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING MARCH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MONTANA POWER
PLANT NAME	COLSTRIP
UNIT NUMBER	1
CITY	COLSTRIP
STATE	MONTANA
GROSS UNIT GENERATING CAPACITY - MW	360
NET UNIT GENERATING CAPACITY W/FGD - MW	332
EQUIVALENT SCRUBBED CAPACITY - MW	360

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20569.	(8843 BTU/LB)
AVERAGE ASH CONTENT - %	8.60	
AVERAGE MOISTURE CONTENT - %	23.90	
AVERAGE SULFUR CONTENT - %	.77	
AVERAGE CHLORIDE CONTENT - %	.01	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME/ALKALINE FLYASH
SYSTEM SUPPLIER	THYSSEN/CEA
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	60.00
ENERGY CONSUMPTION - %	3.3
COMMERIAL START-UP DATE	11/75
INITIAL START-UP DATE	9/75
CONTRACT AWARDED	10/72

*** SLUDGE

** TREATMENT

METHOD	BLEED

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	20.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.5

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	96.0						744			
2/81	SYSTEM	97.4						672			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY-FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	99.8						744			
4/81	SYSTEM	96.6						720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

MONTANA POWER: COLSTRIP 1 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTHS OF MAY AND JUNE, COLSTRIP UNITS 1 AND 2 WERE OFF AND ON (ON AN ALTERNATING BASIS) FOR GENERAL UNIT OVERHAULS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO_2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							749			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

PERFORMANCE INFORMATION FOR THE THIRD QUARTER 1981 IS NOT YET AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	MONTANA POWER
PLANT NAME	COLSTRIP
UNIT NUMBER	2
CITY	COLSTRIP
STATE	MONTANA
GROSS UNIT GENERATING CAPACITY - MW	360
NET UNIT GENERATING CAPACITY W/FGD - MW	332
EQUIVALENT SCRUBBER CAPACITY - MW	360

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20569.	(8843 BTU/LB)
AVERAGE ASH CONTENT - %	8.60	
AVERAGE MOISTURE CONTENT - %	23.90	
AVERAGE SULFUR CONTENT - %	.77	
AVERAGE CHLORIDE CONTENT - %	.01	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME/ALKALINE FLYASH
SYSTEM SUPPLIER	THYSSEN/CEA
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	60.00
ENERGY CONSUMPTION - %	3.3
COMMERIAL START-UP DATE	10/76
INITIAL START-UP DATE	5/76
CONTRACT AWARDED	10/72

*** SLUDGE

** TREATMENT

METHOD	BLEED

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	20.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.5

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	97.5						744			
2/81	SYSTEM	97.4						672			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY AND FEBRUARY NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	98.0						744			
4/81	SYSTEM	94.5						720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

MONTANA POWER: COLSTRIP 2 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTHS OF MAY AND JUNE, COLSTRIP UNITS 1 AND 2 WERE OFF AND ON (ON AN ALTERNATING BASIS) FOR GENERAL UNIT OVERHAULS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

PERFORMANCE INFORMATION FOR THE THIRD QUARTER 1981 IS NOT YET AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

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COMPANY NAME                                   MONTANA-DAKOTA UTILITIES
PLANT NAME                                     COYOTE
UNIT NUMBER                                    1
CITY                                           BEULAH
STATE                                          NORTH DAKOTA
REGULATORY CLASSIFICATION                      E
PARTICULATE EMISSION LIMITATION - NG/J           43.          (  .100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J                  516.          ( 1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J                 ******         (****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW             *****
GROSS UNIT GENERATING CAPACITY - MW              440
NET UNIT GENERATING CAPACITY W/FGD - MW          400
NET UNIT GENERATING CAPACITY WO/FGD - MW         405
EQUIVALENT SCRUBBED CAPACITY - MW                440

 ** UNIT DATA - BOILER AND STACK
     BOILER SUPPLIER                           BABCOCK & WILCOX
     BOILER TYPE                               CYCLONE
     BOILER SERVICE LOAD                       BASE
     DESIGN BOILER FLUE GAS FLOW - CU.M/S      ********       (******* ACFM)
     BOILER FLUE GAS TEMPERATURE - C           *******        (**** F)
     STACK HEIGHT - M                          ******         (**** FT)
     STACK SHELL                               ******
     STACK TOP DIAMETER - M                    *******        (***** FT)

 ** FUEL DATA
     FUEL TYPE                                 COAL
     FUEL GRADE                                LIGNITE
     AVERAGE HEAT CONTENT - J/G                16398.         (  7050 BTU/LB)
     RANGE HEAT CONTENT - BTU/LB                               ******
     AVERAGE ASH CONTENT - %                       6.50
     RANGE ASH CONTENT - %                     ******
     AVERAGE MOISTURE CONTENT - %              ********
     RANGE MOISTURE CONTENT - %                ******
     AVERAGE SULFUR CONTENT - %                     .87
     RANGE SULFUR CONTENT - %                  ******
     AVERAGE CHLORIDE CONTENT - %              ********
     RANGE CHLORIDE CONTENT - %                ******

*** PARTICLE CONTROL

 ** FABRIC FILTER
     NUMBER                                      1
     SUPPLIER                                  WHEELABRATOR-FRYE
     NUMBER OF COMPARTMENTS                       38
     TYPICAL GAS/CLOTH RATIO - M/MIN                .9        (  2.8 FT/MIN)

 ** PARTICLE SCRUBBER
     GENERIC TYPE                              NONE
     SPECIFIC TYPE                             N/A
     TRADE NAME/COMMON NAME                    N/A
     GAS CONTACTING DEVICE TYPE                N/A

*** FGD SYSTEM

 ** GENERAL DATA
     SALEABLE PRODUCT/THROWAWAY PRODUCT        THROWAWAY PRODUCT
     SO2 REMOVAL MODE                          SPRAY DRYING
     PROCESS TYPE                              SODIUM CARBONATE/SPRAY DRYING
     SYSTEM SUPPLIER                           WHEELABRATOR-FRYE/R.I.
     A-E FIRM                                  BECHTEL
     DEVELOPMENT LEVEL                         FULL SCALE
     NEW/RETROFIT                              NEW
     UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %   99.50
     UNIT DESIGN SO2 REMOVAL EFFICIENCY - %        70.00
     ENERGY CONSUMPTION - %                         1.1
     CURRENT STATUS                              1
     COMMERCIAL START-UP                         5/81
     INITIAL START-UP                            4/81
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MONTANA-DAKOTA UTILITIES: COYOTE 1 (CONT.)

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 ** DESIGN AND OPERATING PARAMETERS
     SPACE REQUIREMENTS - SQ M                     3437.3       (  37000 SQ FT)
     OPER. & MAINT. REQUIREMENT - MANHR/DAY          72.0

 ** QUENCHER/PRESATURATOR
     CONSTRUCTION MATERIAL GENERIC TYPE          NR
     CONSTRUCTION MATERIAL SPECIFIC TYPE         NR

 ** ABSORBER
     GENERIC TYPE                                SPRAY DRYER
     SPECIFIC TYPE                               NR
     TRADE NAME/COMMON TYPE                      NR
     SUPPLIER                                    ATOMICS INTERNATIONAL
     SHELL GENERIC MATERIAL                      NA
     SHELL SPECIFIC MATERIAL                     NA
     SHELL MATERIAL TRADE NAME/COMMON TYPE       NA
     LINER GENERIC MATERIAL                      NONE
     LINER SPECIFIC MATERIAL                     N/A
     LINER MATERIAL TRADE NAME/COMMON TYPE       N/A
     GAS CONTACTING DEVICE TYPE                  NONE

 ** MIST ELIMINATOR
     PRE-MIST ELIMINATOR/MIST ELIMINATOR         NONE
     GENERIC TYPE                                N/A
     SPECIFIC TYPE                               N/A
     TRADE NAME/COMMON TYPE                      N/A
     CONSTRUCTION MATERIAL GENERIC TYPE          NR
     CONSTRUCTION MATERIAL SPECIFIC TYPE         NR

 ** REHEATER
     GENERIC TYPE                                NONE
     SPECIFIC TYPE                               N/A
     TRADE NAME/COMMON TYPE                      N/A
     CONSTRUCTION MATERIAL GENERIC TYPE          NONE
     CONSTRUCTION MATERIAL SPECIFIC TYPE         N/A

 ** FANS
     APPLICATION                                 INDUCED DRAFT
     SERVICE                                     DRY

 ** DAMPERS
     FUNCTION                                    NR
     GENERIC TYPE                                NR
     SPECIFIC TYPE                               NR
     CONSTRUCTION MATERIAL GENERIC TYPE          NR
     CONSTRUCTION MATERIAL SPECIFIC TYPE         NR
     LINER GENERIC MATERIAL TYPE                 NR
     LINER SPECIFIC MATERIAL TYPE                NR

 ** DUCTWORK
     SHELL GENERIC MATERIAL TYPE                 NR
     SHELL SPECIFIC MATERIAL TYPE                NR
     LINER GENERIC MATERIAL TYPE                 NR
     LINER SPECIFIC MATERIAL TYPE                NR

 ** REAGENT PREPARATION EQUIPMENT
     FUNCTION                                    MIX TANK
     DEVICE                                      N/A
     DEVICE TYPE                                 AGITATED TANK

 ** SOLIDS CONCENTRATING/DEWATERING
     DEVICE                                      NONE

*** SLUDGE

 ** TREATMENT
     METHOD                                      N/A
     DEVICE                                      N/A
```

MONTANA-DAKOTA UTILITIES: COYOTE 1 (CONT.)

PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	LANDFILL
SITE TREATMENT	NONE

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL START-UP AND SHAKEDOWN PROCEDURES OF THE DRY SCRUBBING FGD SYSTEM COMMENCED IN APRIL.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER 1981 THE UNIT WAS FOR MOST PART OFF-LINE DUE TO BOILER TUBE LEAKS, VARIOUS EQUIPMENT TRIPS, CIRCUIT BREAKER WAS HIT BY LIGHTNING, AND SCHEDULED OUTAGE FOR A BOILER/TURBINE INSPECTION.

SINCE START-UP, HIGH TEMPERATURE AND PLUGGING HAVE BEEN ENCOUNTERED WITH THE DRY SCRUBBER. PRESENTLY, VARIOUS MODIFICATIONS ARE BEING TESTED TO REMEDY THESE PROBLEMS. THESE VARIOUS PROBLEMS CONTRIBUTED TO THE DOWNTIME OF THE SYSTEM.

UTILITY ALSO REPORTED HAVING PROBLEMS WITH FAN BLADE EROSION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE THIRD QUARTER 1981, THIS SPRAY DRYER FGD SYSTEM OPERATED ON A LIMITED BASIS ONLY, PRIMARILY AS A RESULT OF EXCESSIVE ASH BUILDUP IN THE SPRAY DRYER COMPARTMENT. OTHER PROBLEMS REPORTED DURING THE QUARTER INCLUDED FAILURE OF THE GEAR REDUCER ON THE ROTARY ATOMIZER AND POOR GAS DISTRIBUTION AND RETENTION IN THE SPRAY DRYER COMPARTMENT. AS OF YET, THE UTILITY HAS BEEN UNABLE TO OPERATE THE SYSTEM AT A LEVEL SUFFICIENT TO ACHIEVE THE DESIGN SO2 REMOVAL EFFICIENCY.

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                                   SECTION 3
              DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS
--------------------------------------------------------------------------------------------------

 COMPANY NAME                                  NEVADA POWER
 PLANT NAME                                    REID GARDNER
 UNIT NUMBER                                   1
 CITY                                          MOAPA
 STATE                                         NEVADA
 GROSS UNIT GENERATING CAPACITY - MW             125
 NET UNIT GENERATING CAPACITY W/FGD - MW         110
 EQUIVALENT SCRUBBED CAPACITY - MW               125

 ** FUEL DATA
     FUEL TYPE                                 COAL
     FUEL GRADE                                BITUMINOUS
     AVERAGE HEAT CONTENT - J/G                 28959.        ( 12450 BTU/LB)
     AVERAGE ASH CONTENT - %                       8.00
     AVERAGE MOISTURE CONTENT - %                  5.50
     AVERAGE SULFUR CONTENT - %                     .50
     AVERAGE CHLORIDE CONTENT - %                   .05

*** FGD SYSTEM

 ** GENERAL DATA
     PROCESS TYPE                              SODIUM CARBONATE
     SYSTEM SUPPLIER                           THYSSEN/CEA
     NEW/RETROFIT                              RETROFIT
     PARTICULATE DESIGN REMOVAL EFFICIENCY - %    97.00
     SO2 DESIGN REMOVAL EFFICIENCY - %            90.00
     ENERGY CONSUMPTION - %                    *******
     COMMERIAL START-UP DATE                     4/74
     INITIAL START-UP DATE                       3/74
     CONTRACT AWARDED                            7/71

*** SLUDGE

 ** TREATMENT
     METHOD                                    BLEED

 ** DISPOSAL
     TYPE                                      POND

 ** FGD SPARE CAPACITY INDICES
     ABSORBER - %                                   .0

 ** FGD SPARE COMPONENT INDICES
     ABSORBER                                       .0


-------------------------------------------PERFORMANCE DATA---------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 1/81  SYSTEM     85.1        85.5        85.5        85.1                  744    741    633

       ** PROBLEMS/SOLUTIONS/COMMENTS

                          DURING JANUARY THE FGD SYSTEM WAS REMOVED FROM SERVICE TO REPAIR LEAKS
                          ENCOUNTERED IN THE VENTURI.

 2/81  SYSTEM     42.8        54.3        54.2        42.7                  672    528    287

       ** PROBLEMS/SOLUTIONS/COMMENTS

                          DURING FEBRUARY THE FGD SYSTEM WAS DOWN FOR APPROXIMATELY 384 HOURS DUE TO
                          SCHEDULED MAINTENANCE ON THE VENTURI TANK.

 3/81  SYSTEM     76.2        73.1        73.1        60.6                  744    617    451
 EPA UTILITY FGD SURVEY: JULY - SEPTEMBER 1981

NEVADA POWER: REID GARDNER 1 (CONT.)


-------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              DURING MARCH THE BOILER WAS OUT OF SERVICE APPROXIMATELY 91 HOURS DUE TO
                              A TUBE LEAK.

                              ADDITIONAL UNIT OUTAGE TIME WAS DUE TO THE FAILURE OF THE AIR PREHEATER
                              DRIVE.

                              THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY 177 HOURS DUE TO REPAIRS
                              TO THE VENTURI TANK.

 4/81  SYSTEM      96.2         99.4        99.4        96.2                     720   697    693

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              DURING APRIL PROBLEMS WERE ENCOUNTERED WITH THE BYPASS SYSTEM CAUSING
                              APPROXIMATELY 18 HOURS OF OUTAGE TIME.

                              ADDITIONAL OUTAGE TIME WAS DUE TO THE HIGH EXHAUST LOAD TEMPERATURE.

 5/81  SYSTEM      87.9         66.9        67.1        26.7                     744   296    198

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              DURING MAY THE UNIT WAS DOWN PART OF THE TIME FOR A SCHEDULED OVERHAUL.

                              DURING MAY, LOW VENTURI FLOW CAUSED THE SYSTEM TO SHUT DOWN FOR 97 HOURS.

 6/81  SYSTEM      94.2         89.9        93.4        81.2                     720   650    584

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              THE EFFLUENT LINES WERE CLEANED DURING JUNE ACCOUNTING FOR 42 HOURS OF
                              OUTAGE TIME.

                              THE BOILER WAS SCHEDULED TO BE OFF-LINE PART OF JUNE TO REPAIR FEEDWATER
                              HEATERS.

 7/81  SYSTEM     100.0         99.0       100.0        95.2                     744   714    708

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              THE UTILITY REPORTED NO FGD-RELATED OUTAGES FOR THE MONTH OF JULY.

 8/81  SYSTEM      98.7         98.5        98.7        92.9                     744   702    691

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              DOWN TIME WAS REQUIRED TO REPLACE A VALVE IN THE EMERGENCY SPRAY SYSTEM.

                              THE SYSTEM WAS FORCED OUT OF SERVICE 4 HOURS WITH HIGH DUCT PRESSURE
                              PROBLEMS.

 9/81  SYSTEM      96.0         90.5        95.0        76.9                     720   612    554

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              SCRUBBER OUTAGE TIME WAS ATTRIBUTED TO INSTRUMENTATION PROBLEMS AND BOILER-
                              RELATED PROBLEMS.  THE INSTRUMENTATION REPAIRS REQUIRED 29 HOURS.
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SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NEVADA POWER
PLANT NAME	REID GARDNER
UNIT NUMBER	2
CITY	MOAPA
STATE	NEVADA
GROSS UNIT GENERATING CAPACITY - MW	125
NET UNIT GENERATING CAPACITY W/FGD - MW	110
EQUIVALENT SCRUBBED CAPACITY - MW	125

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	28959.	(12450 BTU/LB)
AVERAGE ASH CONTENT - %	8.00	
AVERAGE MOISTURE CONTENT - %	5.50	
AVERAGE SULFUR CONTENT - %	.50	
AVERAGE CHLORIDE CONTENT - %	.05	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	SODIUM CARBONATE
SYSTEM SUPPLIER	THYSSEN/CEA
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	97.00
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	4/74
CONTRACT AWARDED	9/71

*** SLUDGE

** TREATMENT

METHOD	BLEED

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	97.1	96.4	96.7	84.2			744	649	626	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY A REHEATER FAN TRIPPED CAUSING ABOUT SIX HOURS OF DOWN TIME.

THE SYSTEM WAS TAKEN OFF LINE PART OF THE MONTH TO REPAIR A VENTURI LINE LEAK.

THE UNIT WAS TAKEN OFF LINE THREE TIMES IN JANUARY TO WORK ON THE GENERATOR.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	93.0	90.4	89.3	74.7			672	555	502	

```
-------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                               SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING FEBRUARY APPROXIMATELY 96 HOURS OF OUTAGE TIME WAS DUE TO SCHEDULED
                           TESTING.

                           REPAIR OF A BOILER TUBE LEAK CAUSED AN ADDITIONAL 39 HOURS OF OUTAGE TIME.

 3/81  SYSTEM      99.5         98.1        98.1        54.8                    744   416    408

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING MARCH THE BOILER WAS OUT OF SERVICE APPROXIMATELY 57 HOURS DUE TO
                           A TUBE LEAK.

                           THE BOILER WAS TAKEN OFF LINE ON MARCH 22 FOR A SCHEDULED MAINTENANCE
                           OVERHAUL.  THE UNIT REMAINED OFF LINE THROUGHOUT THE MONTH.

                           SEVERAL BOILER TRIPS CAUSED AN ADDITIONAL 56 HOURS OF OUTAGE TIME.

 4/81  SYSTEM     100.0         94.6        94.6         7.4                    720    56     53

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 664 HOURS DUE TO
                           A SCHEDULED MAINTENANCE OVERHAUL.

 5/81  SYSTEM      96.3         96.1        96.2        93.5                    744   724    696

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           A LEAK IN THE VENTURI DISCHARGE LINE CAUSED ABOUT A DAY OUTAGE DURING
                           MAY.

                           THE BOILER WAS TAKEN OFF-LINE PART OF THE MONTH TO REMOVE ASH.

 6/81  SYSTEM      90.7         88.5        89.2        75.8                    720   616    546

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           DURING JUNE A VENTURI BOX LEAK CAUSED THE SYSTEM TO BE OFF-LINE FOR ABOUT
                           55 HOURS.

                           THE UNIT WAS OFF LINE THREE DIFFERENT TIMES TO REMOVE ASH.

                           THE SYSTEM WAS TAKE OFF-LINE FOR 12 HOURS DUE TO EMERGENCY SPRAY PROBLEMS.

 7/81  SYSTEM      98.8         97.4        98.5        78.4                    744   599    584

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           APPROXIMATELY 9 HOURS OF OUTAGE TIME WERE REQUIRED DURING THE MONTH TO
                           CLEAN THE TRAY SCREEN AND RECTIFY A SCRUBBER DUCT PRESSURE PROBLEM.

                           A STACK INSPECTION WAS CONDUCTED DURING THE MONTH.

 8/81  SYSTEM      98.4         98.1        98.3        95.5                    744   724    710

       ** PROBLEMS/SOLUTIONS/COMMENTS

                           THE SYSTEM WAS OUT OF SERVICE 6 HOURS TO REPLACE A VALVE IN THE EMERGENCY
                           SPRAY SYSTEM DURING AUGUST.

                           6 HOURS OF OUTAGE TIME WERE REQUIRED TO REPLACE A VALVE ON A VENTURI PUMP
```

NEVADA POWER: REID GARDNER 2 (CONT.)

AND TO CLEAN THE VENTURI THROAT SPRAY (RACE TRACK).

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM	99.5	99.4	99.5	99.3			720	719	715	

** PROBLEMS/SOLUTIONS/COMMENTS

THE SCRUBBING SYSTEM WAS SHUT DOWN FOR 3 HOURS TO REPAIR THE ID FAN ACCESS DOOR.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NEVADA POWER
PLANT NAME	REID GARDNER
UNIT NUMBER	3
CITY	MOAPA
STATE	NEVADA
GROSS UNIT GENERATING CAPACITY - MW	125
NET UNIT GENERATING CAPACITY W/FGD - MW	110
EQUIVALENT SCRUBBED CAPACITY - MW	125
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	28959. (12450 BTU/LB)
AVERAGE ASH CONTENT - %	8.00
AVERAGE MOISTURE CONTENT - %	9.00
AVERAGE SULFUR CONTENT - %	.50
AVERAGE CHLORIDE CONTENT - %	.05
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	SODIUM CARBONATE
SYSTEM SUPPLIER	THYSSEN/CEA
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	7/76
INITIAL START-UP DATE	6/76
CONTRACT AWARDED	7/73
*** SLUDGE	
** TREATMENT	
METHOD	BLEED
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	98.9	98.9	98.9	98.9			744	744	735	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE SYSTEM WAS SHUT DOWN APPROXIMATELY EIGHT HOURS TO REPAIR THE OUTLET DRAIN LINE AND TO UNPLUG THE VENTURI NOZZLES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	100.0	100.0	100.0	100.0			672	672	672	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	88.6	67.2	67.2	30.0			744	332	223	

NEVADA POWER: REID GARDNER 3 (CONT.)

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-----------------------------------------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        DURING MARCH THE BOILER WAS OUT OF SERVICE APPROXIMATELY 403 HOURS DUE TO
                        MAINTENANCE.

                        APPROXIMATELY 85 HOURS OF OUTAGE TIME WAS DUE TO THE CLEANING OF THE
                        VENTURI NOZZLES AND THE TRAY SPRAY.

 4/81  SYSTEM     100.0       99.7        99.7        94.2                     720   680    678

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 28 HOURS TO REMOVE
                        BUILD UP ON PENDENTS.

 5/81  SYSTEM      97.7       97.5        97.8        96.4                     744   735    717

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        DURING MAY THE SYSTEM WAS OFF-LINE FOR APPROXIMATELY SEVEN HOURS TO REPAIR
                        A LEAK IN THE VENTURI LINE.

                        THE VENTURI PUMP NEEDED REPAIR DURING THE MONTH CAUSING ADDITIONAL DOWN
                        TIME.

                        PROBLEMS WERE ENCOUNTERED WITH A TEMPERATURE PROBE.

 6/81  SYSTEM     100.0      100.0       100.0       100.0                     720   720    720

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        THE UTILITY REPORTED THAT NO PROBLEMS WERE ENCOUNTERED DURING JUNE.

 7/81  SYSTEM      96.8       96.3        96.7        93.0                     744   719    692

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        24 HOURS OF OUTAGE TIME WERE REQUIRED TO CLEAN THE VENTURI THROAT SPRAY
                        (RACE TRACK).  THE RACE TRACK WAS CLEANED TWICE DURING THE MONTH.

                        THE STACK WAS INSPECTED DURING JULY.

 8/81  SYSTEM      97.9       97.9        97.9        97.9                     744   744    728

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        THE SYSTEM WAS OUT OF SERVICE FOR 16 HOURS DURING AUGUST TO CLEAN THE
                        ABSORBER TRAY.

 9/81             100.0       98.2       100.0        75.0
       SYSTEM
                                                                               720   550

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        THERE WERE NO FGD-RELATED OUTAGES DURING THE MONTH OF SEPTEMBER.
```

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NORTHERN INDIANA PUB SERVICE	
PLANT NAME	DEAN H. MITCHELL	
UNIT NUMBER	11	
CITY	GARY	
STATE	INDIANA	
GROSS UNIT GENERATING CAPACITY - MW	116	
NET UNIT GENERATING CAPACITY W/FGD - MW	94	
EQUIVALENT SCRUBBED CAPACITY - MW	115	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	25586.	(11000 BTU/LB)
AVERAGE ASH CONTENT - %	********	
AVERAGE MOISTURE CONTENT - %	11.00	
AVERAGE SULFUR CONTENT - %	3.50	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	WELLMAN LORD	
SYSTEM SUPPLIER	DAVY MCKEE	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	98.50	
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	12.1	
COMMERIAL START-UP DATE	6/77	
INITIAL START-UP DATE	7/76	
CONTRACT AWARDED	6/72	
*** SALEABLE BYPRODUCT		
BYPRODUCT NATURE	ELEMENTAL SULFUR	
DISPOSITION	******	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	100.0	.0		.0			744	602	0	
2/81	SYSTEM	100.0	.0		.0			672		0	
3/81	SYSTEM	100.0	.0		.0			744		0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS NOT CALLED UPON TO OPERATE DURING THE FIRST QUARTER 1981 DUE TO THE BOILER OPERATING ON LOW SULFUR COAL. HOWEVER, THE FGD SYSTEM WAS AVAILABLE THROUGHOUT THE PERIOD.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	100.0	.0		.0			720		0	
5/81	SYSTEM	100.0	.0		.0			744		0	
6/81	SYSTEM	100.0	.0		.0			720		0	

NORTHERN INDIANA PUB SERVICE: DEAN H. MITCHELL 11 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS NOT CALLED UPON TO OPERATE DURING THE SECOND QUARTER 1981 DUE TO THE BOILER OPERATING ON LOW SULFUR COAL. HOWEVER, THE FGD SYSTEM WAS AVAILABLE THROUGHOUT THE PERIOD.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	100.0	.0		.0			744		0	
8/81	SYSTEM	100.0	.0		.0			744		0	
9/81	SYSTEM	100.0	.0		.0			720		0	

** PROBLEMS/SOLUTIONS/COMMENTS

THE D. H. MITCHELL FGD SYSTEM REMAINED INACTIVE DURING THE THIRD QUARTER 1981 AS LOW SULFUR COAL CONTINUED TO BE UTILIZED IN THE BOILER. CURRENTLY, THE UTILITY IS PERFORMING AN ECONOMIC AND PERFORMANCE EVALUATION OF UTILIZING LOW SULFUR COAL ON A REGULAR BASIS.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NORTHERN STATES POWER
PLANT NAME	RIVERSIDE
UNIT NUMBER	6-7
CITY	MINNEAPOLIS
STATE	MINNESOTA
GROSS UNIT GENERATING CAPACITY - MW	110
NET UNIT GENERATING CAPACITY W/FGD - MW	103
EQUIVALENT SCRUBBED CAPACITY - MW	110
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	21632. (9300 BTU/LB)
AVERAGE ASH CONTENT - %	8.00
AVERAGE MOISTURE CONTENT - %	22.00
AVERAGE SULFUR CONTENT - %	1.20
AVERAGE CHLORIDE CONTENT - %	********
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIME/SPRAY DRYING
SYSTEM SUPPLIER	JOY MFG/NIRO ATOMIZER
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	12/80
INITIAL START-UP DATE	11/80
CONTRACT AWARDED	10/79
*** SLUDGE	
** TREATMENT	
METHOD	N/A
** DISPOSAL	
TYPE	LANDFILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/80	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATIONS AT THE RIVERSIDE UNIT COMMENCED IN NOVEMBER 1980. BY THE END OF NOVEMBER SUFFICIENT CHECKOUT HAD BEEN ACCOMPLISHED TO PERMIT PRELIMINARY FGD AND ESP OPERATION AND TEST WORK.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/80	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

IN DECEMBER THE FGD SYSTEM WAS IN A PRELIMINARY OPERATION MODE AND THE NEW ID FANS AND BAGHOUSE WERE IN FINAL CHECKOUT.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			

NORTHERN STATES POWER: RIVERSIDE 6-7 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

BY MID-JANUARY THE PRELIMINARY CHECKOUT WAS COMPLETED AND THE NEW ID FANS AND BAGHOUSE WERE BROUGHT INTO SERVICE WITHOUT THE FGD SYSTEM IN OPERATION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM							672			

** PROBLEMS/SOLUTIONS/COMMENTS

THE NEW ID FANS AND BAGHOUSE OPERATED WITHOUT THE FGD SYSTEM UNTIL LATE FEBRUARY SO THAT THE BOILER DRAFT CONTROL SYSTEM COULD BE ADJUSTED. AT THE CONCLUSION OF THE PERIOD, FULL LOAD BAGHOUSE PERFORMANCE TESTING WAS ACCOMPLISHED. RESULTS OF THE TESTS SHOWED NEGLIGIBLE TEMPERATURE CHANGES ACROSS THE FGD MODULE (WHICH WAS ACTING ONLY AS A BYPASS DUCT), A SMALL TEMPERATURE CHANGE ACROSS THE BAGHOUSE, STACK OPACITIES OF LESS THAN 5% FOR THE RIVERSIDE STACK DIAMETER, AND AN OUTLET MASS LOADING OF LESS THAN 0.03 LB/MMBTU.

BEGINNING IN LATE FEBRUARY AND CARRYING THROUGH EARLY MARCH, THE FGD SYSTEM OPERATED TO PERFORM THE FINAL TUNING OF THE ANALOG AND COMPUTER CONTROL SYSTEM.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

ON MARCH 12, THE ENTIRE NEW SYSTEM WAS OPERATED FOR THE FIRST TIME. A WEEK LATER THE BOILER AND TURBINE EXPERIENCED PROBLEMS LIMITING OPERATION. BUT, BY MARCH 19, THE ENTIRE SYSTEM WAS OPERATING WITH THE LOAD INCREASING AS THE PLANT REPAIR WORK WAS BEING COMPLETED. BY MARCH 21, THE SYSTEM WAS INTO FGD AND BAGHOUSE PARAMETRIC TESTING AT FULL LOAD. SINCE THAT TIME, NEARLY ALL THE KEY TEST PARAMETERS HAVE DEMONSTRATED AT SEVERAL LEVELS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT A PROBLEM WITH THE START-UP OF THE MATERIAL DISCHARGE SYSTEM HAS BEEN CAUSED BY A FAULTY MATERIAL SPECIFICATION ON THE CHAIN CONVEYOR AND SEVERAL LEGS OF TEMPORARY DENSE PHASE PNEUMATIC PIPING. AS OF APRIL, A NEW CONVEYOR OF HARDER MATERIAL HAD BEEN INSTALLED AND ALL TEMPORARY DISCHARGE PIPING REMOVED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTHS OF MAY AND JUNE WERE NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 IS NOT YET AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NORTHERN STATES POWER
PLANT NAME	SHERBURNE
UNIT NUMBER	1
CITY	BECKER
STATE	MINNESOTA
GROSS UNIT GENERATING CAPACITY - MW	740
NET UNIT GENERATING CAPACITY W/FGD - MW	700
EQUIVALENT SCRUBBED CAPACITY - MW	740
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	19771. (8500 BTU/LB)
AVERAGE ASH CONTENT - %	9.00
AVERAGE MOISTURE CONTENT - %	25.00
AVERAGE SULFUR CONTENT - %	.80
AVERAGE CHLORIDE CONTENT - %	.03
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE/ALKALINE FLYASH
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	50.00
ENERGY CONSUMPTION - %	2.7
COMMERIAL START-UP DATE	5/76
INITIAL START-UP DATE	3/76
CONTRACT AWARDED	0/71
*** SLUDGE	
** TREATMENT	
METHOD	FORCED OXIDATION
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	9.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	73.2
2/81	SYSTEM	100.0	100.0	100.0	95.0			672	640	640	71.2
3/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	78.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

WORK IS CONTINUING ON CONVERTING THE MARBLE BED SCRUBBING SYSTEM TO A SPRAY TOWER SYSTEM. FIVE OF THE TWELVE ABSORBERS ARE COMPLETED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			

NORTHERN STATES POWER: SHERBURNE 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE THIRD QUARTER THE FGD SYSTEM OPERATED WITH NO MAJOR PROBLEMS BEING REPORTED. ALL TWELVE ABSORBER MODULES ARE OPERATING IN THE SPRAY TOWER MODE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	NORTHERN STATES POWER
PLANT NAME	SHERBURNE
UNIT NUMBER	2
CITY	BECKER
STATE	MINNESOTA
GROSS UNIT GENERATING CAPACITY - MW	740
NET UNIT GENERATING CAPACITY W/FGD - MW	700
EQUIVALENT SCRUBBED CAPACITY - MW	740

**** FUEL DATA**

FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	19771. (8500 BTU/LB)
AVERAGE ASH CONTENT - %	9.00
AVERAGE MOISTURE CONTENT - %	25.00
AVERAGE SULFUR CONTENT - %	.80
AVERAGE CHLORIDE CONTENT - %	.03

***** FGD SYSTEM**

**** GENERAL DATA**

PROCESS TYPE	LIMESTONE/ALKALINE FLYASH
SYSTEM SUPPLIER	COMBUSTION ENGINEERING
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	50.00
ENERGY CONSUMPTION - %	2.7
COMMERCIAL START-UP DATE	4/77
INITIAL START-UP DATE	3/77
CONTRACT AWARDED	0/71

***** SLUDGE**

**** TREATMENT**

METHOD	FORCED OXIDATION

**** DISPOSAL**

TYPE	POND

**** FGD SPARE CAPACITY INDICES**

ABSORBER - %	9.0

**** FGD SPARE COMPONENT INDICES**

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	76.5
2/81	SYSTEM	100.0	100.0	100.0	98.8			672	664	664	77.0
3/81	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	78.8

**** PROBLEMS/SOLUTIONS/COMMENTS**

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

WORK IS CONTINUING ON CONVERTING THE MARBLE BED SCRUBBING SYSTEM TO A SPRAY TOWER SYSTEM. SEVEN OF THE TWELVE ABSORBERS ARE COMPLETED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			

NORTHERN STATES POWER: SHERBURNE 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE THIRD QUARTER THE FGD SYSTEM OPERATED WITH NO MAJOR PROBLEMS BEING REPORTED. ALL TWELVE ABSORBER MODULES ARE OPERATING IN THE SPRAY TOWER MODE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PACIFIC POWER & LIGHT
PLANT NAME	JIM BRIDGER
UNIT NUMBER	4
CITY	ROCK SPRINGS
STATE	WYOMING
GROSS UNIT GENERATING CAPACITY - MW	550
NET UNIT GENERATING CAPACITY W/FGD - MW	508
EQUIVALENT SCRUBBED CAPACITY - MW	550

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	21632.	(9300 BTU/LB)
AVERAGE ASH CONTENT - %	9.00	
AVERAGE MOISTURE CONTENT - %	18.00	
AVERAGE SULFUR CONTENT - %	.56	
AVERAGE CHLORIDE CONTENT - %	.01	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	SODIUM CARBONATE
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.00
SO2 DESIGN REMOVAL EFFICIENCY - %	91.00
ENERGY CONSUMPTION - %	.2
COMMERIAL START-UP DATE	2/80
INITIAL START-UP DATE	9/79
CONTRACT AWARDED	10/76

*** SLUDGE

** TREATMENT

METHOD	THICKENED

** DISPOSAL

TYPE	POND

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744	695		

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTH OF JANUARY WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	41	93.3	83.8	93.7	82.4						
	42	83.9	82.1	88.0	80.8						
	43	31.5	23.6	27.3	23.2						
	SYSTEM	69.6	63.2	69.7	62.1			672	661	417	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 43 WAS DOWN FOR APPROXIMATELY 11 DAYS DURING FEBRUARY FOR INSTALLATION OF A NEW PRESATURATOR AND RECYCLE NOZZLES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	41	85.3	81.0	83.4	73.4						

PACIFIC POWER & LIGHT: JIM BRIDGER 4 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	42	70.6	70.6	68.5	64.0						
	43	49.5	42.1	43.0	38.2						
	SYSTEM	68.5	64.6	65.0	58.5			744	674	435	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH, PROBLEMS WERE ENCOUNTERED WITH FLOW METERS AND THERE WAS A LACK OF SPARE PARTS NECESSARY FOR FGD SYSTEM OPERATION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	41	3.3	1.2	1.1	1.1						
	42	90.8	88.6	89.0	82.4						
	43	100.0	93.4	99.7	86.9						
	SYSTEM	62.5	61.1	63.3	56.8			720	669	409	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 41 EXPERIENCED LOW AVAILABILITY DURING APRIL AS A RESULT OF FAILURE OF THE MAG FLOW METER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	41	100.0	76.1	100.0	59.1						
	42	.0	.0	.0	.0						
	43	100.0	98.8	100.0	76.7						
	SYSTEM	66.7	58.3	66.7	45.3			744	578	337	

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE 42 WAS UNAVAILABLE DURING MAY DUE TO FAILURE OF THE MAG FLOW METER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	41	100.0	99.1	99.1	95.1						
	42	100.0	.0		.0						
	43	100.0	98.9	100.0	95.0						
	SYSTEM	100.0	66.0	99.6	63.4			720	691	456	

** PROBLEMS/SOLUTIONS/COMMENTS

NO MAJOR FGD RELATED PROBLEMS WERE REPORTED FOR THE MONTH OF JUNE. MODULE 42 WAS NOT IN SERVICE AS A RESULT OF LOW UNIT DEMAND.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

PERFORMANCE DATA FOR FOR THE THIRD QUARTER 1981 WERE UNAVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PENNSYLVANIA POWER
PLANT NAME	BRUCE MANSFIELD
UNIT NUMBER	1
CITY	SHIPPINGPORT
STATE	PENNSYLVANIA
GROSS UNIT GENERATING CAPACITY - MW	917
NET UNIT GENERATING CAPACITY W/FGD - MW	825
EQUIVALENT SCRUBBED CAPACITY - MW	917
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	26749. (11500 BTU/LB)
AVERAGE ASH CONTENT - %	12.90
AVERAGE MOISTURE CONTENT - %	7.00
AVERAGE SULFUR CONTENT - %	3.00
AVERAGE CHLORIDE CONTENT - %	********
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIME
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.80
SO2 DESIGN REMOVAL EFFICIENCY - %	92.10
ENERGY CONSUMPTION - %	6.0
COMMERIAL START-UP DATE	6/76
INITIAL START-UP DATE	12/75
CONTRACT AWARDED	10/74
*** SLUDGE	
** TREATMENT	
METHOD	FIXATION
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							672			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT THE FGD SYSTEM AVAILABILITY WAS 99.13%.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM	99.9						720	457		

PENNSYLVANIA POWER: BRUCE MANSFIELD 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

MINOR UNIT OUTAGES OCCURRED DURING THE SECOND QUARTER DUE TO BOILER TUBE LEAKS. THE UTILITY REPORTED THAT THE YEAR TO DATE UNIT AVAILABILITY WAS 69.82%.

DURING THE SECOND QUARTER NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED. THE UTILITY REPORTED THAT THE YEAR TO DATE FGD SYSTEM AVAILABILITY WAS 99.0%.

7/81	SYSTEM							744			
8/81	SYSTEM	97.0						744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OVERALL FGD SYSTEM AVAILABILITY WAS NOT REPORTED FOR THE MONTHS OF JULY AND SEPTEMBER. THE MAJOR PROBLEM ENCOUNTERED DURING THE THIRD QUARTER WAS MIST ELIMINATOR CLEANING.

THE YEAR TO DATE AVAILABILITY OF THE FGD SYSTEM (THROUGH AUGUST) WAS REPORTED TO BE 98.5%.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PENNSYLVANIA POWER	
PLANT NAME	BRUCE MANSFIELD	
UNIT NUMBER	2	
CITY	SHIPPINGPORT	
STATE	PENNSYLVANIA	
GROSS UNIT GENERATING CAPACITY - MW	917	
NET UNIT GENERATING CAPACITY W/FGD - MW	825	
EQUIVALENT SCRUBBED CAPACITY - MW	917	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
AVERAGE ASH CONTENT - %	12.90	
AVERAGE MOISTURE CONTENT - %	7.00	
AVERAGE SULFUR CONTENT - %	3.00	
AVERAGE CHLORIDE CONTENT %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.80	
SO2 DESIGN REMOVAL EFFICIENCY - %	92.10	
ENERGY CONSUMPTION - %	6.0	
COMMERIAL START-UP DATE	10/77	
INITIAL START-UP DATE	7/77	
CONTRACT AWARDED	10/74	
*** SLUDGE		
** TREATMENT		
METHOD	FIXATION	
** DISPOSAL		
TYPE	POND	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OUT OF SERVICE ON FEBRUARY 28, 1981 FOR A SCHEDULED FOUR WEEK OUTAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT THE FGD SYSTEM AVAILABILITY WAS 97.37%.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			

PENNSYLVANIA POWER: BRUCE MANSFIELD 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	SYSTEM							744			
6/81	SYSTEM	99.8						720	590		

** PROBLEMS/SOLUTIONS/COMMENTS

MINOR UNIT OUTAGES OCCURRED DURING THE SECOND QUARTER DUE TO BOILER TUBE LEAKS THE UNIT WAS ALSO DOWN DURING PART OF THE QUARTER DUE TO LOW LOAD REQUIREMENTS. THE UTILITY REPORTED THAT THE YEAR TO DATE UNIT AVAILABILITY WAS 72.9%.

DURING THE SECOND QUARTER NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED. THE UTILITY REPORTED THAT THE YEAR TO DATE FGD SYSTEM AVAILABILITY WAS 98.2%.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM	96.7						744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OVERALL FGD SYSTEM AVAILABILITY WAS NOT REPORTED FOR THE MONTHS OF JULY AND SEPTEMBER. THE MAJOR PROBLEM ENCOUNTERED DURING THE THIRD QUARTER WAS MIST ELIMINATOR CLEANING.

THE YEAR TO DATE AVAILABILITY OF THE FGD SYSTEM (THROUGH AUGUST) WAS REPORTED TO BE 97.9%.

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                                 SECTION 3
             DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS
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COMPANY NAME                                    PENNSYLVANIA POWER
PLANT NAME                                      BRUCE MANSFIELD
UNIT NUMBER                                     3
CITY                                            SHIPPINGPORT
STATE                                           PENNSYLVANIA
GROSS UNIT GENERATING CAPACITY - MW               917
NET UNIT GENERATING CAPACITY W/FGD - MW           825
EQUIVALENT SCRUBBED CAPACITY   MW                 917

 ** FUEL DATA
    FUEL TYPE                                   COAL
    FUEL GRADE                                  ******
    AVERAGE HEAT CONTENT - J/G                   26749.        ( 11500 BTU/LB)
    AVERAGE ASH CONTENT - %                         12.50
    AVERAGE MOISTURE CONTENT - %                     7.00
    AVERAGE SULFUR CONTENT - %                       3.00
    AVERAGE CHLORIDE CONTENT - %                ********

*** FGD SYSTEM

 ** GENERAL DATA
    PROCESS TYPE                                LIME
    SYSTEM SUPPLIER                             PULLMAN KELLOGG
    NEW/RETROFIT                                NEW
    PARTICULATE DESIGN REMOVAL EFFICIENCY - %      95.00
    SO2 DESIGN REMOVAL EFFICIENCY - %              92.20
    ENERGY CONSUMPTION - %                      *******
    COMMERIAL START-UP DATE                       6/80
    INITIAL START-UP DATE                         6/80
    CONTRACT AWARDED                            **/**

*** SLUDGE

 ** TREATMENT
    METHOD                                      FIXATION

 ** DISPOSAL
    TYPE                                        LANDFILL

 ** FGD SPARE CAPACITY INDICES
    ABSORBER - %                                   25.0

 ** FGD SPARE COMPONENT INDICES
    ABSORBER                                        1.0


------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL  PER  BOILER  FGD   CAP.
                                                               SO2  PART. HOURS HOURS HOURS FACTOR
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 1/81  SYSTEM                                                               744

 2/81  SYSTEM                                                               672

 3/81  SYSTEM                                                               744

       ** PROBLEMS/SOLUTIONS/COMMENTS

                       DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT THE FGD SYSTEM
                       AVAILABILITY WAS 99.92%.

 4/81  SYSTEM                                                               720

 5/81  SYSTEM                                                               744

 6/81  SYSTEM      97.8                                                     720   614
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PENNSYLVANIA POWER: BRUCE MANSFIELD 3 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT THE YEAR TO DATE UNIT AVAILABILITY WAS 80.9 %.

DURING THE SECOND QUARTER NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED. THE UTILITY REPORTED THAT THE YEAR TO DATE FGD SYSTEM AVAILABILITY WAS 96.5 %.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM	99.1						744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OVERALL FGD SYSTEM AVAILABILITY WAS NOT REPORTED FOR THE MONTHS OF JULY AND SEPTEMBER. THE MAJOR PROBLEM ENCOUNTERED DURING THE THIRD QUARTER WAS MIST ELIMINATOR CLEANING.

THE YEAR TO DATE AVAILABILITY OF THE FGD SYSTEM (THROUGH AUGUST) WAS REPORTED TO BE 97.2%.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PUBLIC SERVICE OF NEW MEXICO	
PLANT NAME	SAN JUAN	
UNIT NUMBER	1	
CITY	WATERFLOW	
STATE	NEW MEXICO	
GROSS UNIT GENERATING CAPACITY - MW	361	
NET UNIT GENERATING CAPACITY W/FGD - MW	314	
EQUIVALENT SCRUBBED CAPACITY - MW	361	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20934.	(9000 BTU/LB)
AVERAGE ASH CONTENT - %	22.00	
AVERAGE MOISTURE CONTENT - %	14.82	
AVERAGE SULFUR CONTENT - %	.80	
AVERAGE CHLORIDE CONTENT - %	.03	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	WELLMAN LORD	
SYSTEM SUPPLIER	DAVY MCKEE	
NEW/RETROFIT	RETROFIT	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.80	
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	4.4	
COMMERIAL START-UP DATE	4/78	
INITIAL START-UP DATE	4/78	
CONTRACT AWARDED	2/74	
*** SALEABLE BYPRODUCT		
BYPRODUCT NATURE	ELEMENTAL SULFUR	
DISPOSITION	MARKETED	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	33.3	
** FGD SPARE COMPONENT INDICES		
ABSORBER	2.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	98.9	96.3		94.3						
	B	99.2	97.0		95.0						
	C	98.3	94.0		92.1						
	D	.0	.0		.0						
	SYSTEM	100.0	99.0	100.0	97.0			744	729	722	87.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 15 HOURS TO REPAIR THE LEAK IN THE BOILER FEEDWATER PUMP DISCHARGE LINE.

MODULE D WAS OUT OF SERVICE DURING JANUARY TO CLEAN AND BALANCE THE BOOSTER BLOWER ROTOR.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	79.9	73.7		67.3						
	B	97.3	93.1		85.0						
	C	29.6	26.8		24.4						
	D	67.4	43.9		40.0						
	SYSTEM	98.9	92.0	96.0	84.0			672	613	565	75.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 1 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE BOILER WAS DOWN APPROXIMATELY 72 HOURS TO REPAIR THE AIR DUCT TO THE COAL MILL AND BECAUSE OF CONTAMINATED CONDENSATE AND BOILER FEEDWATER.

MODULES A AND C WERE DOWN APPROXIMATELY 72 HOURS DUE TO LACK OF DEMAND. MODULE C REMAINED DOWN APPROXIMATELY 384 HOURS DUE TO THE REPAIRS OF THE ISOLATION DAMPER.

MODULE D WAS IN SERVICE ON MARCH 2, 1981 AFTER ISOLATION DAMPER REPAIRS WERE COMPLETED.

MODULE D EXPERIENCED A 72 HOUR OUTAGE DUE TO LOW BOILER LOAD. THE OUTAGE CONTINUED FOR APPROXIMATELY 96 HOURS TO BALANCE THE BOOSTER BLOWER ROTOR.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	97.4	76.8		34.7						
	B	95.0	55.4		25.0						
	C	27.0	22.9		10.3						
	D	.0	.0		.0						
	SYSTEM	100.0	66.0	82.0	30.0			744	336	223	38.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH OPERATION OF MODULE C WAS ERRATIC DUE TO SEVERAL BOILER TRIPS.

MODULE D WAS OUT OF SERVICE THE ENTIRE MONTH TO BALANCE THE BOOSTER BLOWER ROTOR

THE BOILER WAS OUT OF SERVICE FROM MARCH 5 UNTIL MARCH 24 DUE TO A SCHEDULED OUTAGE. ADDITIONAL OUTAGE TIME ON MARCH 30 WAS DUE TO A LOSS OF POWER FEED FROM THE MAIN TRANSFORMER.

AN ADDITIONAL 24 HOURS OF OUTAGE TIME WAS DUE TO THE MALFUNCTION OF THE ESP.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	96.9	94.0		84.2						
	B	92.2	82.9		74.3						
	C	96.7	94.0		84.2						
	D	8.5	9.5		8.5						
	SYSTEM	100.0	99.0	100.0	89.0			720	645	641	88.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOOSTER BLOWERS TRIPPED NUMEROUS TIMES BECAUSE OF COMPUTER PROBLEMS AND FOR REASONS UNKNONW.

MODULE D REMAINED OUT OF SERVICE UNTIL APRIL 23, DUE TO THE BALANCING OF THE BOOSTER BLOWER AND THE REPAIRING OF THE SCREW DRIVE ON THE INLET ISOLATION DAMPER.

THE BOILER WAS OUT FO SERVICE APPROXIMATELY 72 HOURS TO REPAIR A WATERWALL TUBE LEAK.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	A	97.0	63.6		63.6						
	B	94.8	90.6		90.6						
	C	29.2	28.9		28.9						
	D	95.2	93.7		93.7						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	98.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 1 (CONT.)

PERFORMANCE DATA											
PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MODULE C EXPERIENCED SOME OUTAGE TIME DUE TO A BROKEN JACK SCREW ON THE ISOLATION DAMPER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	A	60.7	31.8		27.5						
	B	63.1	41.3		35.7						
	C	27.1	13.3		11.5						
	D	58.2	31.2		26.9						
	SYSTEM	64.7	45.0	50.8	38.9			720	622	280	80.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE ALL THE MODULES WERE DOWN PART OF THE MONTH FOR INSTRUMENT AIR TIE-IN AT THE FLYASH FILTERS AND BECAUSE OF A MULTIPLEXER FAILURE.

MODULE C INLET ISOLATION DAMPER REPAIRS WERE PERFORMED DURING THE MONTH.

MODULE D WAS UNAVAILABLE PART OF THE MONTH WHILE THE BOOSTER BLOWER ROTOR WAS BALANCED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	54.8	.0		.0						
	B	97.2	92.5		92.2						
	C	99.5	88.0		87.8						
	D	99.7	89.8		89.5						
	SYSTEM	100.0	97.0	100.0	96.0			744	742	717	81.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS UNAVAILABLE FOR PART OF JULY AS A RESULT OF PROBLEMS WITH THE INLET ISOLATION DAMPER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	A	100.0	.0		.0						
	B	100.0	98.9		98.9						
	C	100.0	97.8		97.8						
	D	99.9	95.8		95.8						
	SYSTEM	100.0	100.0	100.0	100.0			744	744	744	86.0
9/81	A	100.0	.0		.0						
	B	98.5	57.2		24.3						
	C	99.2	71.2		30.3						
	D	99.4	67.0		28.5						
	SYSTEM	100.0	75.0	90.0	32.0			720	701	228	82.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNIT WAS REMOVED FROM SERVICE FROM SEPTEMBER 11 TO SEPTEMBER 28 FOR A SCHEDULED FALL OUTAGE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PUBLIC SERVICE OF NEW MEXICO
PLANT NAME	SAN JUAN
UNIT NUMBER	2
CITY	WATERFLOW
STATE	NEW MEXICO
GROSS UNIT GENERATING CAPACITY - MW	350
NET UNIT GENERATING CAPACITY W/FGD - MW	306
EQUIVALENT SCRUBBED CAPACITY - MW	350

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	20934. (9000 BTU/LB)
AVERAGE ASH CONTENT - %	22.00
AVERAGE MOISTURE CONTENT - %	10.50
AVERAGE SULFUR CONTENT - %	.80
AVERAGE CHLORIDE CONTENT - %	.03

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	WELLMAN LORD
SYSTEM SUPPLIER	DAVY MCKEE
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	********
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	4.6
COMMERIAL START-UP DATE	8/78
INITIAL START-UP DATE	8/78
CONTRACT AWARDED	2/74

*** SALEABLE BYPRODUCT

BYPRODUCT NATURE	ELEMENTAL SULFUR
DISPOSITION	MARKETED

** FGD SPARE CAPACITY INDICES

ABSORBER - %	33.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	E	98.5	84.1		84.1						
	F	97.7	79.2		79.2						
	G	.0	.0		.0						
	H	97.6	89.8		89.8						
	SYSTEM	97.0	76.0	98.0	76.0			744	744	563	98.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULE F WAS OUT OF SERVICE APPROXIMATELY 17 HOURS DUE TO BOILER LOAD CURTAILMENT.

THE FGD SYSTEM OPERATED ERRATICALLY DURING JANUARY DUE TO PRECIPITATOR PROBLEMS AND HIGH SOLIDS IN THE SCRUBBER SUMPS.

MODULE G REMAINED OUT OF SERVICE DUE TO REPAIRS ON THE INTERNALS DAMAGED BY A FIRE ON MARCH 24, 1980.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	E	96.6	43.2		34.4						
	F	99.1	54.0		43.0						
	G	.0	.0		.0						

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	H	93.0	69.7		55.5						
	SYSTEM	96.0	31.0	99.0	25.0			672	535	166	68.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY MODULE E WAS OUT OF SERVICE APPROXIMATELY 72 HOURS DUE TO LACK OF DEMAND. THE TOTAL SYSTEM OPERATED INTERMITTENTLY FROM MARCH 2 THROUGH MARCH 10, 1981 DUE TO PRECIPITATOR REPAIRS.

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 48 HOURS TO REPAIR A WATERWALL TUBE LEAK AND APPROXIMATELY 96 HOURS TO REPAIR AN ECONOMIZER TUBE LEAK.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	E	98.1	81.2		63.2						
	F	95.1	79.8		62.1						
	G	.0	.0		.0						
	H	94.5	86.2		67.1						
	SYSTEM	94.0	82.0	94.0	64.0			744	579	476	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER WAS OUT OF SERVICE APPROXIMATELY 165 HOURS DUE TO A SCHEDULED MAINTENANCE OUTAGE.

MODULE E WAS OUT OF SERVICE APPROXIMATELY 72 HOURS AND MODULE F FOR APPROXIMATELY 48 HOURS DUE TO LOW STACK GAS TEMPERATURE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	E	70.3	6.9		5.3						
	F	97.8	88.2		67.6						
	G	.0	.0		.0						
	H	96.9	90.8		69.6						
	SYSTEM	78.0	62.0	66.0	47.0			720	552	340	70.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 168 HOURS DUE TO A SCHEDULED OUTAGE.

MODULE E WAS OUT OF SERVICE UNTIL APRIL 20, DUE TO HIGH BOOSTER BLOWER VIBRATIONS AND TO CLEAR PLUGGED TRAY RECIRCULATION PUMP LINES AND VALVES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	E	95.4	86.8		66.5						
	F	98.2	81.1		62.1						
	G	4.3	5.6		4.3						
	H	95.7	77.2		59.1						
	SYSTEM	97.8	83.5	95.8	64.0			744	570	476	71.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 144 HOURS TO REMOVE CLINKERS FROM THE BOTTOM ASH AREA IN THE BOILER.

ADDITIONAL BOILER OUTAGE TIME WAS NEEDED TO REPAIR A BROKEN OIL LINE AT THE TURBINE.

ADDITIONAL OUTAGE TIME WAS DUE TO THE BOTTOM COLLECTOR TRAY LEAKING AT ALL FOUR WALLS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	E	62.4	49.7		49.7						
	F	60.8	45.4		45.4						
	G	27.4	18.8		18.8						
	H	42.1	12.5		12.5						
	SYSTEM	62.5	41.8	47.4	41.8			720	720	301	91.0

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

ALL THE ABSORBER MODULES WERE DOWN DURING PART OF THE MONTH FOR AN INSTRUMENT TIE-IN AT THE FLYASH FILTERS, TO MAKE ELECTRICAL CONNECTIONS TO NEW BUS BARS AND BECAUSE OF MULTIPLEXER PROBLEMS.

MODULE H WAS UNAVAILABLE PART OF JUNE DUE TO INLET DAMPER PROBLEMS.

MODULE G NEEDED INTERNAL REPAIRS DURING THE MONTH.

7/81	E	99.1	70.7		70.7						
	F	98.9	87.5		87.5						
	G	51.5	30.5		30.5						
	H	59.9	19.1		19.1						
	SYSTEM	93.0	80.0	86.0	80.0			744	744	594	74.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE H WAS DOWN FOR THE FIRST THIRTEEN DAYS OF THE MONTH FOR REPAIRS TO THE INLET ISOLATION DAMPER.

OPERATION OF THE FGD SYSTEM WAS LIMITED TO TWO ABSORBERS DURING THE LATTER HALF OF THE MONTH DUE TO A LACK OF STACK REHEAT.

8/81	E	100.0	52.5		42.5						
	F	100.0	61.3		49.6						
	G	10.3	13.3		10.8						
	H	100.0	.0		.0						
	SYSTEM	100.0	54.0	100.0	43.0			744	602	323	85.0

** PROBLEMS/SOLUTIONS/COMMENTS

OUTAGE TIME DURING THE MONTH FOR THE E AND F MODULES WAS ATTRIBUTED TO PROBLEMS WITH THE ELECTROSTATIC PRECIPITATORS. AS A RESULT, THE UNIT WAS DOWN FROM AUGUST 14 TO AUGUST 28 FOR PRECIPITATOR REPAIRS.

THE H MODULE WAS ON STANDBY THE ENTIRE MONTH SINCE ONLY TWO MODULES CAN BE OPERATED WITHOUT STACK GAS REHEAT.

THE G MODULE WAS DOWN MOST OF THE MONTH AS A RESULT OF MIST ELIMINATOR PAD DAMAGE AND HIGH SOLUTION LOSSES INTO THE SUMP.

9/81	E	11.9	5.5		5.4						
	F	25.4	17.9		17.6						
	G	75.0	10.4		10.3						
	H	93.9	23.4		23.1						
	SYSTEM	69.0	19.0	19.0	19.0			720	710	137	86.0

** PROBLEMS/SOLUTIONS/COMMENTS

ALL FGD SYSTEM MODULES WERE DOWN FROM SEPTEMBER 11 TO SEPTEMBER 30 AS A RESULT OF A SCHEDULED CHEMICAL PLANT OUTAGE.

THE G MODULE RESTARTED ON SEPTEMBER 8 AFTER COMPLETION OF MIST ELIMINATOR AND TRAY REPAIRS.

THE LACK OF STACK REHEAT KEPT MODULE F OFF-LINE THE MAJORITY OF THE MONTH.

THE H MODULE WAS DOWN FOR TWO DAYS DURING THE MONTH BECAUSE OF HIGH VIBRATION ON THE BOOSTER FAN.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	PUBLIC SERVICE OF NEW MEXICO
PLANT NAME	SAN JUAN
UNIT NUMBER	3
CITY	WATERFLOW
STATE	NEW MEXICO
GROSS UNIT GENERATING CAPACITY - MW	534
NET UNIT GENERATING CAPACITY W/FGD - MW	468
EQUIVALENT SCRUBBED CAPACITY - MW	534

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	SUBBITUMINOUS	
AVERAGE HEAT CONTENT - J/G	20934.	(9000 BTU/LB)
AVERAGE ASH CONTENT - %	22.00	
AVERAGE MOISTURE CONTENT - %	10.50	
AVERAGE SULFUR CONTENT - %	.80	
AVERAGE CHLORIDE CONTENT - %	.03	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	WELLMAN LORD
SYSTEM SUPPLIER	DAVY MCKEE
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	3.6
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	12/79
CONTRACT AWARDED	8/78

*** SALEABLE BYPRODUCT

BYPRODUCT NATURE	SULFURIC ACID
DISPOSITION	MARKETED

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	M	99.9	90.0	98.0	55.0						
	SYSTEM	99.9	90.0	98.0	55.0			744	452	409	61.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 264 HOURS TO REMOVE A CLINKER AND TO REPAIR A SUPERHEATER TUBE LEAK.

A BOILER TRIP CAUSED BY A LOW DRUM LEVEL CAUSED A SHORT OUTAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	M	61.0	80.0	80.0	75.0						
	SYSTEM	61.0	80.0	80.0	75.0			672	633	504	91.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 48 HOURS DUE TO THE REPAIRS OF THE SUPERHEATER TUBE LEAK.

MODULE M WAS OUT OF SERVICE APPROXIMATELY 24 HOURS DUE TO A MAINTENANCE INSPECTION.

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	M	98.3	97.2	97.8	96.5						
	SYSTEM	98.3	97.2	97.8	96.5			744	739	718	90.3

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER WAS OUT OF SERVICE FOR APPROXIMATELY AN HOUR DUE TO THE FAILURE OF THE STEAM FLOW TRANSMITTER.

4/81	M	20.0	74.0	100.0	20.0						
	SYSTEM	20.0	74.0	100.0	20.0			720	195	145	24.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 525 HOURS DUE TO A SCHEDULED MAINTENANCE OVERHAUL.

MODULE M WAS OUT OF SERVICE APPROXIMATELY 50 HOURS DUE THE REPLACEMENT OF THE MIST ELIMINATOR BEAMS AND REPAIRING OF BRICKWORK IN THE VENTURI.

5/81	M	7.5	36.8	36.8	5.8						
	SYSTEM	7.5	36.8	36.8	5.8			744	117	43	11.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 600 HOURS DUE TO A SCHEDULED MAINTENANCE OVERHAUL.

DURING THE BOILER OUTAGE TIME THE UPPER AND LOWER MIST ELIMINATOR BEAMS IN MODULE M WERE REPLACED.

A PORTION OF THE ABRASION RESISTANT TILES IN THE VENTURI SCRUBBER WERE ALSO REPLACED DURING MAY.

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 24 HOURS DUE TO A TUBE LEAK.

6/81	M	70.8	55.9	55.9	27.8						
	SYSTEM	70.8	55.9	55.9	27.8			720	358	200	35.0

** PROBLEMS/SOLUTIONS/COMMENTS

TWO BOILER OUTAGES IN JUNE WERE CAUSED BY SUPERHEATER TUBE LEAKS.

MODULE M WAS DOWN FROM JUNE 4 THROUGH JUNE 11 TO BALANCE THE BOOSTER BLOWER ROTOR.

7/81	M	98.1	96.5	97.3	96.7						
	SYSTEM	98.0	96.0	97.0	96.0			744	738	712	93.0

** PROBLEMS/SOLUTIONS/COMMENTS

UNIT 3 HAD TWO ONE-DAY OUTAGES DURING THE MONTH THAT RESULTED FROM FAILURE OF THE BOILER FEED PUMP CONTROLLER.

8/81	M	85.5	85.5	85.5	85.5						
	SYSTEM	85.5	85.5	85.5	85.5			744	744	636	97.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE M WAS DOWN FOR FOUR DAYS DURING THE MONTH FOR INSPECTION OF THE INTERNALS.

9/81	M	96.8	31.8	31.8	31.0						
	SYSTEM	96.8	31.8	31.8	31.0			720	701	223	82.0

EPA UTILITY FGD SURVEY: JULY - SEPTEMBER 1981

PUBLIC SERVICE OF NEW MEXICO: SAN JUAN 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
						SO2	PART.				

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE M WAS DOWN FOR TWO DAYS DURING THE FIRST HALF OF THE MONTH FOR BALANCING OF THE BOOSTER BLOWER ROTOR.

A SCHEDULED CHEMICAL PLANT OUTAGE KEPT MODULE M OFF-LINE FROM SEPTEMBER 11 TO SEPTEMBER 30.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SALT RIVER PROJECT
PLANT NAME	CORONADO
UNIT NUMBER	1
CITY	ST. JOHNS
STATE	ARIZONA
GROSS UNIT GENERATING CAPACITY - MW	350
NET UNIT GENERATING CAPACITY W/FGD - MW	350
EQUIVALENT SCRUBBED CAPACITY - MW	280
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	27912. (12000 BTU/LB)
AVERAGE ASH CONTENT - %	25.00
AVERAGE MOISTURE CONTENT - %	16.00
AVERAGE SULFUR CONTENT - %	.50
AVERAGE CHLORIDE CONTENT - %	********
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	PULLMAN KELLOGG
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.87
SO2 DESIGN REMOVAL EFFICIENCY - %	66.00
ENERGY CONSUMPTION - %	4.3
COMMERIAL START-UP DATE	12/79
INITIAL START-UP DATE	11/79
CONTRACT AWARDED	6/76
*** SLUDGE	
** TREATMENT	
METHOD	THICKENED
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	100.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 A FEW MINOR PROBLEMS WERE ENCOUNTERED DUE TO A LINING FAILURE.

THE PERFORMANCE NUMBERS ARE NOT AVAILABLE FOR PUBLICATION AT THIS TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

SALT RIVER PROJECT: CORONADO 1 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS REPORTED PROBLEMS WITH THE PREKRETE LINERS IN THE PRESATURATORS AND BYPASS DUCTS OF BOTH UNITS 1 AND 2. THE UNDERNEATH MATERIAL (SUPPORTS) IS NOT STRONG ENOUGH AND THEY LOSE THE MATERIAL FROM THE TOP AND SIDES OF THE DUCTWORK. SPARE FGD SYSTEM CAPACITY HAS KEPT THIS FROM LIMITING BOILER AVAILABILITY.

THERE HAVE BEEN CONTINUING PROBLEMS WITH THE PVC LINERS IN THE THICKENERS. THICKENER SPARE CAPACITY HAS KEPT THIS FROM AFFECTING AVAILABILITY OF THE FGD SYSTEM. THE LINERS ARE PATCHED AS NEEDED.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SALT RIVER PROJECT
PLANT NAME	CORONADO
UNIT NUMBER	2
CITY	ST. JOHNS
STATE	ARIZONA
GROSS UNIT GENERATING CAPACITY - MW	350
NET UNIT GENERATING CAPACITY W/FGD - MW	350
EQUIVALENT SCRUBBED CAPACITY - MW	280
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	SUBBITUMINOUS
AVERAGE HEAT CONTENT - J/G	27912. (12000 BTU/LB)
AVERAGE ASH CONTENT - %	25.00
AVERAGE MOISTURE CONTENT - %	16.00
AVERAGE SULFUR CONTENT - %	.50
AVERAGE CHLORIDE CONTENT - %	********
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	PULLMAN KELLOGG
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.87
SO2 DESIGN REMOVAL EFFICIENCY - %	66.00
ENERGY CONSUMPTION - %	4.3
COMMERIAL START-UP DATE	10/81
INITIAL START-UP DATE	7/80
CONTRACT AWARDED	6/76
*** SLUDGE	
** TREATMENT	
METHOD	THICKENED
** DISPOSAL	
TYPE	POND
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	100.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

THE PERFORMANCE DATA ARE NOT YET AVAILABLE FOR RELEASE AT THIS TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

SALT RIVER PROJECT: CORONADO 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY HAS REPORTED PROBLEMS WITH THE PREKRETE LINERS IN THE PRESATURATORS AND BYPASS DUCTS OF BOTH UNITS 1 AND 2. THE UNDERNEATH MATERIAL (SUPPORTS) IS NOT STRONG ENOUGH AND THEY LOSE THE MATERIAL FROM THE TOP AND SIDES OF THE DUCTWORK. SPARE FGD SYSTEM CAPACITY HAS KEPT THIS FROM LIMITING BOILER AVAILABILITY.

THERE HAVE BEEN CONTINUING PROBLEMS WITH THE PVC LINERS IN THE THICKENERS. THICKENER SPARE CAPACITY HAS KEPT THIS FROM AFFECTING AVAILABILITY OF THE FGD SYSTEM. THE LINERS ARE PATCHED AS NEEDED.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

```
COMPANY NAME                                  SAN MIGUEL ELECTRIC
PLANT NAME                                    SAN MIGUEL
UNIT NUMBER                                   1
CITY                                          SAN MIGUEL
STATE                                         TEXAS
REGULATORY CLASSIFICATION                     B
PARTICULATE EMISSION LIMITATION - NG/J           43.         (   .100 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J                  516.         ( 1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J                ******         (****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW              400
GROSS UNIT GENERATING CAPACITY - MW             400
NET UNIT GENERATING CAPACITY W/FGD - MW         380
NET UNIT GENERATING CAPACITY WO/FGD - MW        400
EQUIVALENT SCRUBBED CAPACITY - MW               400

 ** UNIT DATA - BOILER AND STACK
     BOILER SUPPLIER                          BABCOCK & WILCOX
     BOILER TYPE                              PULVERIZED COAL
     BOILER SERVICE LOAD                      BASE
     DESIGN BOILER FLUE GAS FLOW - CU.M/S       943.80       (2000000 ACFM)
     BOILER FLUE GAS TEMPERATURE - C            151.7        ( 305 F)
     STACK HEIGHT - M                           137.         ( 450 FT)
     STACK SHELL                              CONCRETE
     STACK TOP DIAMETER - M                   *******        (***** FT)

 ** FUEL DATA
     FUEL TYPE                                COAL
     FUEL GRADE                               LIGNITE
     AVERAGE HEAT CONTENT - J/G               11630.         (  5000 BTU/LB)
     RANGE HEAT CONTENT - BTU/LB                              4200-6350
     AVERAGE ASH CONTENT - %                     28.00
     RANGE ASH CONTENT - %                    25.0-45.0
     AVERAGE MOISTURE CONTENT - %                30.00
     RANGE MOISTURE CONTENT - %               ******
     AVERAGE SULFUR CONTENT - %                   1.70
     RANGE SULFUR CONTENT - %                 1.5-3.0
     AVERAGE CHLORIDE CONTENT - %                  .06
     RANGE CHLORIDE CONTENT - %               0.01-0.25

*** PARTICLE CONTROL

 ** ESP
     NUMBER                                    1
     TYPE                                     COLD SIDE
     SUPPLIER                                 BABCOCK & WILCOX
     INLET FLUE GAS CAPACITY - CU.M/S           943.8        (2000000 ACFM)
     INLET FLUE GAS TEMPERATURE - C             151.7        (   305 F)
     PRESSURE DROP - KPA                           .2        (   1. IN-H2O)

 ** PARTICLE SCRUBBER
     GENERIC TYPE                             NONE
     SPECIFIC TYPE                            N/A
     TRADE NAME/COMMON NAME                   N/A
     GAS CONTACTING DEVICE TYPE               N/A

*** FGD SYSTEM

 ** GENERAL DATA
     SALEABLE PRODUCT/THROWAWAY PRODUCT       THROWAWAY PRODUCT
     SO2 REMOVAL MODE                         WET SCRUBBING
     PROCESS TYPE                             LIMESTONE
     PROCESS ADDITIVES                        NONE
     SYSTEM SUPPLIER                          BABCOCK & WILCOX
     A-E FIRM                                 TIPPETT & GEE
     DEVELOPMENT LEVEL                        FULL SCALE
     NEW/RETROFIT                             NEW
     UNIT DESIGN SO2 REMOVAL EFFICIENCY - %      86.00
     ENERGY CONSUMPTION - %                       5.0
     CURRENT STATUS                            1
```

SAN MIGUEL ELECTRIC: SAN MIGUEL 1 (CONT.)

INITIAL START-UP	8/81	
CONTRACT AWARDED	0/75	

** DESIGN AND OPERATING PARAMETERS

SPACE REQUIREMENTS - SQ M	18209.8	(196015 SQ FT)

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	1	
GENERIC TYPE	TRAY TOWER	
SPECIFIC TYPE	SIEVE TRAY	
TRADE NAME/COMMON TYPE	N/A	
SUPPLIER	BABCOCK & WILCOX	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	NR	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
GAS CONTACTING DEVICE TYPE	PLASTIC/RUBBER MOBILE BALLS	
NUMBER OF CONTACTING ZONES	2	
LIQUID RECIRCULATION RATE - LITER/S	1250.	(19840 GPM)
L/G RATIO - L/CU.M	6.0	(45.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	3.5	(14.0 IN-H2O)
INLET GAS FLOW - CU. M/S	943.80	(2000000 ACFM)
INLET GAS TEMPERATURE - C	150.0	(302 F)
SO2 REMOVAL EFFICIENCY - %	86.0	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	BAFFLE
TRADE NAME/COMMON TYPE	CLOSED VANE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** REHEATER

GENERIC TYPE	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

NUMBER	2	
NUMBER OF SPARES	0	
DESIGN	AXIAL	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	1016.47	(2154000 ACFM)
FLUE GAS TEMPERATURE - C	151.7	(305 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

SAN MIGUEL ELECTRIC: SAN MIGUEL 1 (CONT.)

```
 ** REAGENT PREPARATION EQUIPMENT
     FUNCTION                                    WET BALL MILL
     DEVICE                                      NR
     DEVICE TYPE                                 NR

 ** SOLIDS CONCENTRATING/DEWATERING
     DEVICE                                      NA

*** SLUDGE

 ** TREATMENT
     METHOD                                      STABILIZATION
     DEVICE                                      PUG MILL
     PROPRIETARY PROCESS                         RESEARCH-COTTRELL

 ** DISPOSAL
     NATURE                                      FINAL
     TYPE                                        LANDFILL
     LOCATION                                    OFF-SITE
     SITE TREATMENT                              NONE

 ** PROCESS CONTROL AND INSTRUMENTATION
     CHEMICAL PARAMETERS                         PH,SOLIDS
     PROCESS CONTROL MANNER                      AUTOMATIC
     PROCESS CHEMISTRY MODE                      FEEDBACK

 ** WATER BALANCE
     WATER LOOP TYPE                             CLOSED
     MAKEUP WATER ADDITION - LITERS/S               37.8        (  600 GPM)


------------------------------- -----------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION % REMOVAL  PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 8/81  SYSTEM                                                               744

 9/81  SYSTEM                                                               720
```

** PROBLEMS/SOLUTIONS/COMMENTS

THE SAN MIGUEL FGD SYSTEM BEGAN OPERATIONS ON AUGUST 13 WHEN ONE OF THE FOUR MODULES WAS STARTED UP.

THE FGD SYSTEM WAS REMOVED FROM SERVICE FOR ONE WEEK AT THE END OF AUGUST TO CORRECT VALVE PROBLEMS. THE VALVES WERE DESIGNED FOR SINGLE DIRECTIONAL FLOW; HOWEVER, SOME BI-DIRECTIONAL FLOWS WERE OCCURING WHICH WAS RESULTING IN VALVE FAILURE.

SINCE INITIAL STARTUP, TWO OF THE THREE MODULES HAVE BEEN OPERATED ON AN ALTERNATING BASIS. THE LIMITED OPERATION HAS RESULTED FROM BOILER PROBLEMS ENCOUNTERED. THE BOILER WILL BE SHUT DOWN ON OCTOBER 16 FOR ONE MONTH SO THAT CORRECTIVE MAINTENANCE CAN BE PERFORMED.

PROBLEMS HAVE BEEN ENCOUNTERED WITH THE LIMESTONE FEED SYSTEM. THE PROBLEMS HAVE BEEN ATTRIBUTED TO EXCESSIVE RAINFALL WHICH HAS CAUSED CLUMPING OF THE MATERIAL.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

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COMPANY NAME                                     SIKESTON BRD OF MUNICIPAL UTIL
PLANT NAME                                       SIKESTON
UNIT NUMBER                                      1
CITY                                             SIKESTON
STATE                                            MISSOURI
REGULATORY CLASSIFICATION                        B
PARTICULATE EMISSION LIMITATION - NG/J           ******        (****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J                   ******        (****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J                   ******        (****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW                 207
GROSS UNIT GENERATING CAPACITY - MW                235
NET UNIT GENERATING CAPACITY W/FGD - MW            207
NET UNIT GENERATING CAPACITY WO/FGD - MW           211
EQUIVALENT SCRUBBED CAPACITY - MW                  235

 ** UNIT DATA - BOILER AND STACK
     BOILER SUPPLIER                             BABCOCK & WILCOX
     BOILER TYPE                                 PULVERIZED COAL
     BOILER SERVICE LOAD                         BASE
     DESIGN BOILER FLUE GAS FLOW - CU.M/S          353.17      ( 748390 ACFM)
     BOILER FLUE GAS TEMPERATURE - C               142.2       ( 288 F)
     STACK HEIGHT - M                              137.        ( 450 FT)
     STACK SHELL                                 CARBON STEEL
     STACK TOP DIAMETER - M                      *******       (***** FT)

 ** FUEL DATA
     FUEL TYPE                                   COAL
     FUEL GRADE                                  BITUMINOUS
     AVERAGE HEAT CONTENT - J/G                  26377.        ( 11340 BTU/LB)
     RANGE HEAT CONTENT - BTU/LB                                 9435-11692
     AVERAGE ASH CONTENT - %                         11.20
     RANGE ASH CONTENT - %                       9.9-15.2
     AVERAGE MOISTURE CONTENT - %                     9.50
     RANGE MOISTURE CONTENT - %                  8.7-19.5
     AVERAGE SULFUR CONTENT - %                       2.80
     RANGE SULFUR CONTENT - %                    2.3-3.3
     AVERAGE CHLORIDE CONTENT - %                      .08
     RANGE CHLORIDE CONTENT - %                  0.06-0.12

*** PARTICLE CONTROL

 ** ESP
     NUMBER                                       2
     TYPE                                        COLD SIDE
     SUPPLIER                                    BABCOCK & WILCOX
     INLET FLUE GAS CAPACITY - CU.M/S              398.7       ( 844824 ACFM)
     INLET FLUE GAS TEMPERATURE - C                153.9       (  309 F)
     PRESSURE DROP - KPA                              .2       (  1. IN-H2O)
     PARTICLE REMOVAL EFFICENCY - %                 99.6

 ** PARTICLE SCRUBBER
     GENERIC TYPE                                VENTURI TOWER
     SPECIFIC TYPE                               VARIABLE-THROAT/SIDE-MOVABLE BLOCKS
     TRADE NAME/COMMON NAME                      N/A
     GAS CONTACTING DEVICE TYPE                  NONE

*** FGD SYSTEM

 ** GENERAL DATA
     SALEABLE PRODUCT/THROWAWAY PRODUCT          THROWAWAY PRODUCT
     SO2 REMOVAL MODE                            WET SCRUBBING
     PROCESS TYPE                                LIMESTONE
     SYSTEM SUPPLIER                             BABCOCK & WILCOX
     A-E FIRM                                    PHIPS-HOGLAND, PHILLIPS, BURNS & MCD
     DEVELOPMENT LEVEL                           FULL SCALE
     NEW/RETROFIT                                NEW
     UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %    99.17
     UNIT DESIGN SO2 REMOVAL EFFICIENCY - %         80.00
     ENERGY CONSUMPTION - %                          1.7
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SIKESTON BRD OF MUNICIPAL UTIL: SIKESTON 1 (CONT.)

CURRENT STATUS	1	
COMMERCIAL START-UP	9/81	
INITIAL START-UP	6/81	

** DESIGN AND OPERATING PARAMETERS

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** ABSORBER

NUMBER	3	
NUMBER OF SPARES	1	
GENERIC TYPE	VENTURI TOWER	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
SUPPLIER	BABCOCK & WILCOX	
SHELL GENERIC MATERIAL	CARBON STEEL	
SHELL SPECIFIC MATERIAL	AISI 1110	
SHELL MATERIAL TRADE NAME/COMMON TYPE	N/A	
LINER GENERIC MATERIAL	ORGANIC	
LINER SPECIFIC MATERIAL	GLASS FLAKE-FILLED POLYESTER	
LINER MATERIAL TRADE NAME/COMMON TYPE	NR	
L/G RATIO - L/CU.M	8.0	(60.0 GAL/1000 ACF)
GAS-SIDE PRESSURE DROP - KPA	2.7	(11.0 IN-H2O)
INLET GAS FLOW - CU. M/S	437.45	(927000 ACFM)
INLET GAS TEMPERATURE - C	142.8	(289 F)
SO2 REMOVAL EFFICIENCY - %	80.0	
PARTICLE REMOVAL EFFICENCY - %	99.6	

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR	
GENERIC TYPE	IMPINGEMENT	
SPECIFIC TYPE	BAFFLE	
TRADE NAME/COMMON TYPE	CLOSED VANE	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** REHEATER

GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
TRADE NAME/COMMON TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	

** FANS

NUMBER	4	
DESIGN	AXIAL	
SUPPLIER	BABCOCK & WILCOX	
APPLICATION	FORCED DRAFT	
SERVICE	DRY	
FLUE GAS FLOW RATE - CU.M/S	389.32	(825000 ACFM)
FLUE GAS TEMPERATURE - C	142.2	(288 F)
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL	

** DAMPERS

FUNCTION	NR	
GENERIC TYPE	NR	
SPECIFIC TYPE	NR	
CONSTRUCTION MATERIAL GENERIC TYPE	NR	
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	

** DUCTWORK

SHELL GENERIC MATERIAL TYPE	NR	
SHELL SPECIFIC MATERIAL TYPE	NR	
LINER GENERIC MATERIAL TYPE	NR	
LINER SPECIFIC MATERIAL TYPE	NR	

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	NR
DEVICE TYPE	NR
MANUFACTURER	KOPPERS

** TANKS

SERVICE	NUMBER
******	****

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NR

*** SLUDGE

** TREATMENT

METHOD	BLEED
DEVICE	N/A
PROPRIETARY PROCESS	N/A

** DISPOSAL

NATURE	FINAL
TYPE	POND
SITE TREATMENT	NONE
SITE DIMENSIONS	54 ACRES
SITE SERVICE LIFE - YRS	8

** PROCESS CONTROL AND INSTRUMENTATION

PROCESS CONTROL MANNER	AUTOMATIC & MANUAL
PROCESS CHEMISTRY MODE	FEED FORWARD

** WATER BALANCE

WATER LOOP TYPE	OPEN	
MAKEUP WATER ADDITION - LITERS/S	11.7	(186 GPM)

** FGD SPARE CAPACITY INDICES

ABSORBER - %	50.0

** FGD SPARE COMPONENT INDICES

ABSORBER	1.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD OPERATION COMMENCED ON JUNE 30, 1981. THE SYSTEM IS IN THE STARTUP PHASE OF OPERATION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE SIKESTON 1 FGD SYSTEM DID NOT OPERATE DURING THE THIRD QUARTER 1981. THE BOILER WAS OPERATIONAL; HOWEVER, FULL SCALE OPERATION OF THE FGD SYSTEM IS NOT EXPECTED UNTIL JANUARY 1982.

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COMPANY NAME                                    SOUTH CAROLINA PUBLIC SERVICE
PLANT NAME                                      WINYAH
UNIT NUMBER                                     2
CITY                                            GEORGETOWN
STATE                                           SOUTH CAROLINA
GROSS UNIT GENERATING CAPACITY - MW               280
NET UNIT GENERATING CAPACITY W/FGD - MW           258
EQUIVALENT SCRUBBED CAPACITY - MW                 140

** FUEL DATA
    FUEL TYPE                                   COAL
    FUEL GRADE                                  BITUMINOUS
    AVERAGE HEAT CONTENT - J/G                   26749.        ( 11500 BTU/LB)
    AVERAGE ASH CONTENT - %                        13.50
    AVERAGE MOISTURE CONTENT - %                ********
    AVERAGE SULFUR CONTENT - %                      1.10
    AVERAGE CHLORIDE CONTENT - %                ********

*** FGD SYSTEM

 ** GENERAL DATA
    PROCESS TYPE                                LIMESTONE
    SYSTEM SUPPLIER                             BABCOCK & WILCOX
    NEW/RETROFIT                                NEW
    PARTICULATE DESIGN REMOVAL EFFICIENCY - %      99.40
    SO2 DESIGN REMOVAL EFFICIENCY - %              45.00
    ENERGY CONSUMPTION - %                          1.1
    COMMERIAL START-UP DATE                     **/**
    INITIAL START-UP DATE                        7/77
    CONTRACT AWARDED                            **/**

*** SLUDGE

 ** TREATMENT
    METHOD                                      THICKENED

 ** DISPOSAL
    TYPE                                        POND

 ** FGD SPARE CAPACITY INDICES
    ABSORBER - %                                    .0

 ** FGD SPARE COMPONENT INDICES
    ABSORBER                                        .0


-------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL  PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

10/80  SYSTEM     13.9         94.0        93.4        13.9                 744   111    103  10.8

       ** PROBLEMS/SOLUTIONS/COMMENTS

                         DURING OCTOBER THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAY AND THE
                         NEW MIST ELIMINATOR WASH SYSTEM WERE COMPLETED.

                         DURING THE SCHEDULED OVERHAUL THE MODULE WAS INSPECTED AND THE RUBBER
                         LINING TESTED.

                         THE MODULE WAS REMOVED FROM SERVICE TO REPACK THE QUENCHER PUMP AND TO
                         INSPECT THE BELTS.

11/80  SYSTEM    100.0        100.0       100.0       100.0                 720   720    720  86.5

12/80  SYSTEM     98.9         98.9        98.9        98.9                 744   744    736  95.7
```

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 2 (CONT.)

```
-------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              DURING DECEMBER THE SYSTEM WAS REMOVED FROM SERVICE DUE TO A LIMESTONE
                              FEEDER FAILURE.

                              OUTAGE TIME DURING THE MONTH WAS ALSO CAUSED BY NECESSARY REPAIRS OF THE
                              SEAL WATER LINE TO THE HOLDING TANK PUMPS.

 1/81  SYSTEM      99.1         99.1        99.1        99.1                    744   744    737  92.3

 2/81  SYSTEM      97.0         97.0        97.0        97.0                    672   672    652  88.6

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              DURING FEBRUARY THE EXPANSION JOINT ON THE QUENCHER DISCHARGE PUMP FAILED
                              CAUSING APPROXIMATELY 20 HOURS OF OUTAGE TIME.

 3/81  SYSTEM     100.0        100.0       100.0       100.0                    744   744    744  70.7

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              THE UTILITY REPORTED THAT NO MAJOR PROBLEMS OTHER THAN THE EXPANSION JOINT
                              FAILURE, OCCURRED DURING THE FIRST QUARTER 1981.

 4/81  SYSTEM                                                                   720

 5/81  SYSTEM                                                                   744

 6/81  SYSTEM                                                                   720

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              INFORMATION FOR THE SECOND QUARTER 1981 IS NOT AVAILABLE AT THIS TIME.

 7/81  SYSTEM      89.4         92.8        96.1        44.2                    744   355    329  33.3

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              UNIT 2 WAS OFF THREE TIMES DURING JULY AS A RESULT OF BOILER TUBE LEAKS.

                              THE FGD SYSTEM WAS REMOVED FROM SERVICE FOR PART OF THE MONTH TO REPAIR
                              LEAKING NOZZLES ON THE QUENCHER PUMP.

 8/81  SYSTEM      98.0         98.0        98.0        98.0                    744   744    730  73.9

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              THE SYSTEM WAS REMOVED FROM SERVICE ONCE DURING THE MONTH TO REPLACE THE
                              BOOSTER FAN EXPANSION JOINT.

 9/81  SYSTEM      96.0         98.0        95.6        88.3                    720   649    636  62.2

       ** PROBLEMS/SOLUTIONS/COMMENTS

                              DURING THE MONTH, MAINTENANCE WAS PERFORMED ON THE QUENCHER SUCTION AND
                              DISCHARGE LINES.
```

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTH CAROLINA PUBLIC SERVICE	
PLANT NAME	WINYAH	
UNIT NUMBER	3	
CITY	GEORGETOWN	
STATE	SOUTH CAROLINA	
GROSS UNIT GENERATING CAPACITY - MW	280	
NET UNIT GENERATING CAPACITY W/FGD - MW	252	
EQUIVALENT SCRUBBED CAPACITY - MW	280	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
AVERAGE ASH CONTENT - %	13.50	
AVERAGE MOISTURE CONTENT - %	********	
AVERAGE SULFUR CONTENT - %	1.10	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	BABCOCK & WILCOX	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	********	
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00	
ENERGY CONSUMPTION - %	2.1	
COMMERIAL START-UP DATE	6/80	
INITIAL START-UP DATE	5/80	
CONTRACT AWARDED	**/**	
*** SLUDGE		
** TREATMENT		
METHOD	THICKENED	
** DISPOSAL		
TYPE	POND	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/80	A	89.2	87.0	87.0	86.0						
	B	97.2	95.0	95.0	94.0						
	SYSTEM	92.4	91.0	91.0	90.0			744	736	670	89.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER SOME OF THE FGD SYSTEM OUTAGE TIME WAS DUE TO PLUGGING OF THE THICKENER UNDERFLOW LINE.

THE THICKENER RAKE DRIVE MECHANISM WAS REPAIRED DURING OCTOBER.

SOME OUTAGE TIME DURING THE MONTH WAS CAUSED BY THE REPLACEMENT OF THE BROKEN BELTS ON THE QUENCHER PUMP.

THE UNIT EXPERIENCED FOUR TRIPS DURING THE MONTH OF OCTOBER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
11/80	A	72.5	72.7	72.7	72.5						
	B	73.2	73.4	73.4	73.2						
	SYSTEM	72.8	73.1	73.1	72.8			720	718	524	90.2

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 3 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER REPAIRS WERE MADE TO THE QUENCHER DISCHARGE LINE, ABSORBER PUMP BELTS AND QUENCHER HEADER CAUSING THE FGD SYSTEM TO BE DOWN. OUTAGE TIME WAS ALSO NEEDED TO UNPLUG THE QUENCHER NOZZLES.

THE FGD SYSTEM WAS OUT OF SERVICE FOR APPROXIMATELY SIX DAYS DUE TO COMPUTER LOGIC PROBLEMS WHICH WERE CAUSED BY A FAULTY LOGIC CARD HOLDER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/80	A	95.7	97.6	97.6	95.7						
	B	94.9	96.8	96.8	94.9						
	SYSTEM	95.3	97.2	97.2	95.3			744	730	709	89.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER OUTAGE TIME WAS NECESSARY FOR REPAIRS TO THE MODULE B QUENCHER PUMP DISCHARGE VALVE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	62.4	75.5	75.5	62.4						
	B	69.2	83.7	83.7	69.2						
	SYSTEM	65.9	79.7	79.7	65.9			744	615	490	69.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY PROBLEMS WITH THE BALL MILL WERE ENCOUNTERED CAUSING THE SYSTEM TO SHUT DOWN.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	83.8	85.2	85.2	80.2						
	B	88.1	89.8	89.8	84.5						
	SYSTEM	86.0	87.6	87.6	82.4			672	633	554	79.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY COMPUTER PROBLEMS CAUSED THE THICKENER SUMP TO FLOOD.

THE INLET DAMPER CAUSED PROBLEMS DURING THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	84.9	100.0	100.0	80.9						
	B	84.9	100.0	100.0	80.9						
	SYSTEM	84.9	100.0	100.0	80.9			744	602	602	69.4

** PROBLEMS/SOLUTIONS/COMMENTS

THE SYSTEM WAS SHUT DOWN ON MARCH 27 DUE TO A SCHEDULED UNIT OUTAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 IS NOT AVAILABLE AT THIS TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	86.2	83.5	85.3	82.8						
	B	90.6	81.3	83.1	80.6						
	SYSTEM	88.4	82.5	84.2	81.8			744	738	608	75.6

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

THE WINYAH 3 BOILER TRIPPED OFF TWICE DURING THE MONTH.

THE QUENCHER PUMPS TRIPPED ONCE DURING THE MONTH ON THE "A" MODULE AS A RESULT OF WATER GETTING INTO THE SWITCHING APPARATUS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	A	81.3	80.5	78.2	67.2						
	B	81.9	88.2	85.8	73.7						
	SYSTEM	81.6	84.3	82.0	70.4			744	621	524	43.2

** PROBLEMS/SOLUTIONS/COMMENTS

MISCELLANEOUS OUTAGES DURING THE MONTH INCLUDED MAINTENANCE REQUIRED ON THE "A" QUENCHER PUMP AND FLOODING OF THE THICKENER UNDERFLOW SUMP.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	A	97.2	95.3	97.0	85.1						
	B	98.8	96.9	98.6	86.5						
	SYSTEM	98.0	96.0	97.7	85.8			720	643	618	50.1

** PROBLEMS/SOLUTIONS/COMMENTS

ONE OUTAGE WAS REQUIRED DURING THE MONTH AS A RESULT OF THE INABILITY TO START THE BALL MILLS.

THERE WERE FOUR UNIT OUTAGES DURING THE MONTH AS A RESULT OF OPACITY AND PRECIPITATOR PROBLEMS.

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COMPANY NAME                                    SOUTH CAROLINA PUBLIC SERVICE
PLANT NAME                                      WINYAH
UNIT NUMBER                                     4
CITY                                            GEORGETOWN
STATE                                           SOUTH CAROLINA
REGULATORY CLASSIFICATION                       A
PARTICULATE EMISSION LIMITATION - NG/J          ******         (****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J                  ******         (****** LB/MMBTU)
NOX EMISSION LIMITATION - NG/J                  ******         (****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW              *****
GROSS UNIT GENERATING CAPACITY - MW               280
NET UNIT GENERATING CAPACITY W/FGD - MW           252
NET UNIT GENERATING CAPACITY WO/FGD - MW          258
EQUIVALENT SCRUBBED CAPACITY - MW                 280

 ** UNIT DATA - BOILER AND STACK
     BOILER SUPPLIER                            RILEY STOKER
     BOILER TYPE                                PULVERIZED COAL
     BOILER SERVICE LOAD                        BASE
     DESIGN BOILER FLUE GAS FLOW - CU.M/S       ********       (******* ACFM)
     BOILER FLUE GAS TEMPERATURE - C            *******        (**** F)
     STACK HEIGHT - M                           ******         (**** FT)
     STACK SHELL                                ******
     STACK TOP DIAMETER - M                     *******        (***** FT)

 ** FUEL DATA
     FUEL TYPE                                  COAL
     FUEL GRADE                                 BITUMINOUS
     AVERAGE HEAT CONTENT - J/G                 26749.         ( 11500 BTU/LB)
     RANGE HEAT CONTENT - BTU/LB                                ******
     AVERAGE ASH CONTENT - %                    ********
     RANGE ASH CONTENT - %                      ******
     AVERAGE MOISTURE CONTENT - %               ********
     RANGE MOISTURE CONTENT - %                 1.0-1.2
     AVERAGE SULFUR CONTENT - %                     1.70
     RANGE SULFUR CONTENT - %                   ******
     AVERAGE CHLORIDE CONTENT - %               ********
     RANGE CHLORIDE CONTENT - %                 ******

*** PARTICLE CONTROL

 ** ESP
     NUMBER                                      1

 ** PARTICLE SCRUBBER
     GENERIC TYPE                               NONE
     SPECIFIC TYPE                              N/A
     TRADE NAME/COMMON NAME                     N/A
     GAS CONTACTING DEVICE TYPE                 N/A

*** FGD SYSTEM

 ** GENERAL DATA
     SALEABLE PRODUCT/THROWAWAY PRODUCT         THROWAWAY PRODUCT
     SO2 REMOVAL MODE                           WET SCRUBBING
     PROCESS TYPE                               LIMESTONE
     SYSTEM SUPPLIER                            AMERICAN AIR FILTER
     A-E FIRM                                   BURNS & ROE
     DEVELOPMENT LEVEL                          FULL SCALE
     NEW/PETROFIT                               NEW
     UNIT DESIGN SO2 REMOVAL EFFICIENCY - %       80.00
     ENERGY CONSUMPTION - %                        2.1
     CURRENT STATUS                              1
     INITIAL START-UP                            7/81

 ** DESIGN AND OPERATING PARAMETERS
```

SOUTH CAROLINA PUBLIC SERVICE: WINYAH 4 (CONT.)

** QUENCHER/PRESATURATOR

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** ABSORBER

GENERIC TYPE	SPRAY TOWER
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY
TRADE NAME/COMMON TYPE	N/A
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
GAS CONTACTING DEVICE TYPE	NONE

** MIST ELIMINATOR

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRIMARY COLLECTOR
GENERIC TYPE	IMPINGEMENT
SPECIFIC TYPE	BAFFLE
TRADE NAME/COMMON TYPE	CLOSED VANE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** REHEATER

GENERIC TYPE	INDIRECT HOT AIR
SPECIFIC TYPE	EXTERNAL HEAT EXCHANGER
TRADE NAME/COMMON TYPE	STEAM TUBE BUNDLE
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

** FANS

APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

** DAMPERS

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** DUCTWORK

SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

** REAGENT PREPARATION EQUIPMENT

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NA

*** SLUDGE

** TREATMENT

METHOD	NR
DEVICE	NR
PROPRIETARY PROCESS	NR

** DISPOSAL

NATURE	NR
TYPE	NR
SITE TREATMENT	NONE

** WATER BALANCE

WATER LOOP TYPE	CLOSED

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD OPERATION COMMENCED IN JULY 1981. HOWEVER, ONLY ONE OF THE TWO ABSORBER MODULES IS OPERATIONAL. A MAJOR FIRE HAS DELAYED THE SCHEDULED START-UP OF THE OTHER MDOULE UNTIL FEBRUARY 1982.

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                                           SECTION 3
               DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS
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 COMPANY NAME                                   SOUTH MISSISSIPPI ELEC PWR
 PLANT NAME                                     R.D. MORROW, SR.
 UNIT NUMBER                                    1
 CITY                                           HATTIESBURG
 STATE                                          MISSISSIPPI
 GROSS UNIT GENERATING CAPACITY - MW              200
 NET UNIT GENERATING CAPACITY W/FGD - MW          180
 EQUIVALENT SCRUBBED CAPACITY - MW                124

 ** FUEL DATA
     FUEL TYPE                                  COAL
     FUEL GRADE                                 BITUMINOUS
     AVERAGE HEAT CONTENT - J/G                  27912.       ( 12000 BTU/LB)
     AVERAGE ASH CONTENT - %                       15.00
     AVERAGE MOISTURE CONTENT - %                   6.50
     AVERAGE SULFUR CONTENT - %                     1.30
     AVERAGE CHLORIDE CONTENT - %                    .01

*** FGD SYSTEM

 ** GENERAL DATA
     PROCESS TYPE                               LIMESTONE
     SYSTEM SUPPLIER                            ENVIRONEERING, RILEY STOKER
     NEW/RETROFIT                               NEW
     PARTICULATE DESIGN REMOVAL EFFICIENCY - %     99.60
     SO2 DESIGN REMOVAL EFFICIENCY - %             52.70
     ENERGY CONSUMPTION - %                         5.5
     COMMERIAL START-UP DATE                     8/78
     INITIAL START-UP DATE                       8/78
     CONTRACT AWARDED                            5/75

*** SLUDGE

 ** TREATMENT
     METHOD                                     STABILIZATION

 ** DISPOSAL
     TYPE                                       LANDFILL

 ** FGD SPARE CAPACITY INDICES
     ABSORBER - %                                    .0

 ** FGD SPARE COMPONENT INDICES
     ABSORBER                                        .0


------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL    PER  BOILER  FGD    CAP.
                                                                SO2  PART.  HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 1/81  SYSTEM     100.0                                   .0                  744     0     0     .0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                          THE BOILER REMAINED OUT SERVICE DUE TO A BALL MILL EXPLOSION.

 2/81  SYSTEM     100.0        91.5       100.0        11.5                   672    84    77    9.0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                          THE BOILER REMAINED OFF LINE 576 HOURS IN FEBRUARY DUE TO THE MILL EXPLO-
                          SION.

 3/81  SYSTEM      86.0        80.3        80.3        26.8                   744   248   199   25.0
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SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 1 (CONT.)

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-------------------------------------------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2   PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING MARCH THE RECYCLE PUMPS TRIPPED CAUSING APPROXIMATELY A HALF HOUR
                            OF OUTAGE TIME.

                            A COMPUTER POWER FAILURE AND AN INSPECTION CAUSED AN ADDITIONAL TWO HOUR
                            OUTAGE.

                            THE LIMESTONE BALL TUBE MILL NEEDED REPAIR DURING MARCH.

 4/81  SYSTEM      49.7         94.1        33.6        26.3                     720   202    189  19.5

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING APRIL THE FGD SYSTEM WAS UNAVAILABLE APPROXIMATELY 362 HOURS DUE
                            TO A LIMESTONE BALL MILL OUTLET SCREEN AND SCRUBBER DUCT INSPECTION.

 5/81  SYSTEM        .0                                  .0                      744     0      0    .0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING MAY THE BOILER DID NOT OPERATE DUE TO SOME NECESSARY REPAIR TO THE
                            SCRUBBER DUCTWORK.

                            AN EXPLOSION IN THE BALL TUBE MILL ALSO PREVENTED OPERATIONS DURING THE
                            MONTH.

 6/81  SYSTEM      91.[illegible]         91.3        91.3        90.7                     720   715    653  76.6

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING JUNE A BALL MILL EXPLOSION AND REPAIRS TO THE DUCT WORK CAUSED 58
                            HOURS OF DOWN TIME.

                            A BALL TUBE MILL BEARING WAS REPLACED CAUSING SIX HOURS OF DOWN TIME.

 7/81  SYSTEM     100.0         98.7        98.7        93.5                     744   705    696  77.9

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING JULY, THE FGD SYSTEM WAS AVAILABLE FOR OPERATION 100 PERCENT OF
                            THE TIME. THERE WERE FOUR MINOR UNIT OUTAGES DURING THE MONTH ATTRIBUTED
                            TO PROBLEMS WITH THE BOILER.

 8/81  SYSTEM     100.0        100.0       100.0       100.0                     744   744    744  83.1

 9/81  SYSTEM      99.4         99.0        99.0        98.2                     720   707    700  68.9

       ** PROBLEMS/SOLUTIONS/COMMENTS

                            DURING THE MONTH, THERE WAS A MINOR OUTAGE (11 HOURS) FOR REPAIR OF THE
                            PRIMARY AIR DUCT.
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SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTH MISSISSIPPI ELEC PWR	
PLANT NAME	R.D. MORROW, SR.	
UNIT NUMBER	2	
CITY	HATTIESBURG	
STATE	MISSISSIPPI	
GROSS UNIT GENERATING CAPACITY - MW	200	
NET UNIT GENERATING CAPACITY W/FGD - MW	180	
EQUIVALENT SCRUBBED CAPACITY - MW	124	
**** FUEL DATA**		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	27912.	(12000 BTU/LB)
AVERAGE ASH CONTENT - %	15.00	
AVERAGE MOISTURE CONTENT - %	6.50	
AVERAGE SULFUR CONTENT - %	1.30	
AVERAGE CHLORIDE CONTENT - %	.01	
***** FGD SYSTEM**		
**** GENERAL DATA**		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	ENVIRONEERING, RILEY STOKER	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.60	
SO2 DESIGN REMOVAL EFFICIENCY - %	52.70	
ENERGY CONSUMPTION - %	5.5	
COMMERIAL START-UP DATE	6/79	
INITIAL START-UP DATE	6/79	
CONTRACT AWARDED	5/75	
***** SLUDGE**		
**** TREATMENT**		
METHOD	STABILIZATION	
**** DISPOSAL**		
TYPE	LANDFILL	
**** FGD SPARE CAPACITY INDICES**		
ABSORBER - %	.0	
**** FGD SPARE COMPONENT INDICES**		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM	39.4	97.6	97.6	87.2			744	665	649	86.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS OUT OF SERVICE APPROXIMATELY 79 HOURS DURING JANUARY DUE TO A BOILER TUBE LEAK.

ADDITIONAL OUTAGE TIME WAS DUE TO THE REPAIRING OF THE MIST ELIMINATOR DRAIN PIPING.

THE SYSTEM WAS UNAVAILABLE APPROXIMATELY TWO HOURS DUE TO THE CLEANING OF THE RECYCLE NOZZLES.

THE LIMESTONE MAKE-UP LINE BROKE CAUSING 12 HOURS OF ADDITIONAL OUTAGE TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	SYSTEM	100.0	99.9	100.0	85.6			672	576	575	74.9

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED FROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM	85.5	86.6	86.6	58.4			744	502	434	49.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY THREE HOURS TO CLEAN THE RECYCLE NOZZLES.

AN ADDITIONAL TWO HOURS OF OUTAGE TIME WAS DUE TO A LEAK IN THE SLURRY SUPPLY PIPING.

THE FGD SYSTEM WAS OUT OF SERVICE APPROXIMATELY 102 HOURS DUE TO REPAIRS TO THE LIMESTONE BALL MILL.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	99.5	98.0	99.5	87.1			720	640	627	71.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 80 HOURS DUE TO A SUPERHEATER TUBE LEAK.

SOME MINOR OUTAGES ENCOUNTERED DURING THE MONTH INCLUDED A RECYCLE PUMP TRIP, A LOOSE CONNECTION ON A TEMPERATURE PROBE AND A SCRUBBER INSPECTION.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	SYSTEM	100.0	99.1	100.0	93.1			744	699	693	77.4

** PROBLEMS/SOLUTIONS/COMMENTS

DUE TO A TUBE LEAK IN THE SUPERHEAT AND REHEAT SECTIONS, THE SYSTEM WAS OFF LINE 45 HOURS IN MAY.

ADDITIONAL OUTAGE TIME WAS CAUSED BY A TURBINE TRIP.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	SYSTEM	97.8	97.3	97.3	97.0			720	718	699	99.7

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE TWO OUTAGE CAUSED BY THE BALL MILL. ON ONE OCCASION A BEARING HAD TO BE REPLACED AND ANOTHER TIME WAS FOR GENERAL REPAIRS.

TEN HOURS OF DOWN TIME WAS CAUSED BY PROBLEMS WITH THE CONTROL CIRCUIT IN THE ESP.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM	100.0	97.1	99.6	93.4			744	716	695	80.9

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, TWO UNIT OUTAGES TOTALLING 48 HOURS OCCURRED. THERE WERE NO FGD RELATED PROBLEMS REPORTED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	SYSTEM	100.0	99.9	100.0	96.4			744	718	717	82.1

** PROBLEMS/SOLUTIONS/COMMENTS

DURING AUGUST, BOILER TUBE LEAKS CAUSED A 25 HOUR UNIT OUTAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM	98.1	98.1	98.1	98.1			720	720	706	75.4

SOUTH MISSISSIPPI ELEC PWR: R.D. MORROW, SR. 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

THERE WERE NO FGD RELATED PROBLEMS ENCOUNTERED DURING THE MONTH OF SEPTEMBER.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTHERN ILLINOIS POWER	
PLANT NAME	MARION	
UNIT NUMBER	4	
CITY	MARION	
STATE	ILLINOIS	
GROSS UNIT GENERATING CAPACITY - MW	173	
NET UNIT GENERATING CAPACITY W/FGD - MW	161	
EQUIVALENT SCRUBBED CAPACITY - MW	173	
** FUEL DATA		
FUEL TYPE	COAL/REFUSE	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	23841.	(10250 BTU/LB)
AVERAGE ASH CONTENT - %	16.69	
AVERAGE MOISTURE CONTENT - %	12.20	
AVERAGE SULFUR CONTENT - %	3.75	
AVERAGE CHLORIDE CONTENT - %	.10	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	BABCOCK & WILCOX	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	.00	
SO2 DESIGN REMOVAL EFFICIENCY - %	89.40	
ENERGY CONSUMPTION - %	2.3	
COMMERIAL START-UP DATE	6/79	
INITIAL START-UP DATE	5/79	
CONTRACT AWARDED	1/76	
*** SLUDGE		
** TREATMENT		
METHOD	STABILIZATION	
** DISPOSAL		
TYPE	LANDFILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	38.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.6	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	40.0	33.9	33.9	33.6						
	B	77.4	65.3	74.9	64.6						
	SYSTEM	59.0	50.0	53.0	49.0			744	737	366	97.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULES A AND B WERE OUT OF SERVICE APPROXIMATELY 159 HOURS DUE TO THE CONVEYOR SYSTEM FREEZING. MODULES A AND B WERE OFFLINE AN ADDITIONAL TWO HOURS DUE TO A LEAK IN THE WASH WALL HEADER.

AN ADDITIONAL 278 HOURS OF OUTAGE TIME TO MODULE A WAS DUE TO A LEAK IN THE CONTINUOUS MIST ELIMINATOR SUPPLY LINE. THE REPAIR OF THIS FIBER-GLAS LINE WAS HAMPERED BY THE COLD WEATHER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	64.3	64.3	64.3	64.3						
	B	70.1	70.1	70.1	70.1						
	SYSTEM	67.3	67.3	67.3	67.3			672	672	452	95.1

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-------------------------------------------PERFORMANCE DATA-------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
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** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE FGD SYSTEM EXPERIENCED INTERMITTENT OPERATION DUE TO A BELT FREEZING. BOTH MODULES WERE OFF LINE APPPROXIMATELY 141 HOURS.

A HOLE IN THE OUTLET DUCTWORK BETWEEN THE ISOLATION DAMPER AND THE STACK CAUSED MODULES A AND B TO BE OFFLINE APPROXIMATELY 59 HOURS.

MODULE B WAS TAKEN OFF LINE FOR APPROXIMATELY THREE HOURS TO REPAIR A LEAK IN THE WALLWASH HEADER.

MODULE A WAS TAKEN OFF LINE TO REPAIR A PINHOLE IN THE ABSORBER DISCHARGE SECTION. THE REPAIR WAS COMPLETED, BUT A MALFUNCTION OF THE OUTLET GUILLOTINE DAMPER CAUSED THE MODULE 11 HOURS OF OUTAGE TIME.

DURING FEBRUARY A BOOSTER FAN TRIPPED OFF LINE THREE TIMES DUE TO HIGH VIBRATION CAUSING APPROXIMATELY 38 HOURS OF OUTAGE TIME.

```
 3/81  A          30.6         46.3        50.3        30.6
       B          98.6         96.7        97.9        64.0
       SYSTEM     64.6         72.3        74.9        47.3                     744   492    352  93.0
```

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OFF LINE ON MARCH 21, 1981 FOR AN ANNUAL MAINTENANCE INSPECTION, AND REMAINED OFF LINE THE REST OF THE MONTH.

MODULE A WAS OFF LINE APPROXIMATELY ONE HOUR DUE TO HIGH VIBRATIONS OF THE BOOSTER FAN. ON MARCH 10 A SHORT IN THE BOOSTER FAN MOTOR CAUSED MODULE A TO BE OUT OF SERVICE FOR THE REST OF THE MONTH.

MODULE B WAS OUT OF SERVICE A TOTAL OF 10 HOURS FOR REPAIRS TO THE LEAKS IN THE WALL WASH HEADERS.

```
 4/81  A          76.3         59.6        83.9        51.9
       B          85.0         82.8        82.8        72.1
       SYSTEM     81.0         71.0        83.0        62.0                     720   627    447  77.0
```

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL MODULE A WAS UNAVAILABLE APPROXIMATELY 206 HOURS DUE TO THE INSTALLATION OF THE REBUILT FAN MOTOR.

ADDITIONAL OUTAGE TIME WAS DUE TO THE REPACKING OF THE QUENCHER PUMP.

APPROXIMATELY FOUR HOURS OF OUTAGE TIME WAS NECESSARY TO REPAIR A WALL WASH HEADER LEAK.

MODULE B WAS OUT OF SERVICE APPROXIMATELY 91 HOURS DUE TO THE INSTALLATION OF A HYDROCLONE HEAD IN THE QUENCHER.

```
 5/81  A          99.5         99.5        99.6        99.5
       B          68.4         68.4        91.2        68.4
       SYSTEM     84.0         84.0        96.0        84.0                     744   744    625  82.7
```

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY MODULES A AND B EXPERIENCED WALL WASH HEADER LEAKS CAUSING SOME OUTAGE TIME.

MODULE B WAS OUT OF SERVICE APPROXIMATELY 227 HOURS DUE TO THE REPLACEMENT OF THE IMPELLER AND RUBBER LINERS ON THE ENGINE AND SUCTION SIDES OF THE PUMP.

SOUTHERN ILLINOIS POWER: MARION 4 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	A	89.5	89.5	89.5	89.5						
	B	47.2	47.2	54.0	47.2						
	SYSTEM	68.4	68.4	71.8	68.4			720	720	493	94.7

** PROBLEMS/SOLUTIONS/COMMENTS

ON JUNE 3 BOTH MODULES WERE OFF-LINE TO ALLOW REPAIR OF WALL WASH HEADER LEAKS. UPON ATTEMPTED STARTUP ON JUNE 3, IT WAS DISCOVERED THAT SEVERAL OF THE ABSORBER PUMP DISCHARGE VALVES WOULD NOT FUNCTION CORRECTLY. THIS CAUSED THE SYSTEM TO REMAIN DOWN THROUGH JUNE 5.

THE BEARING ON MODULE B QUENCHER PUMP FAILED RESULTING IN AN OUTAGE.

MODULE A WAS TAKEN OFF-LINE ON JUNE 24 FOR FOUR HOURS TO REPAIR THE WALL WASH HEADER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	75.1	75.1	91.5	75.1						
	B	73.4	73.4	95.8	73.4						
	SYSTEM	74.3	74.3	93.6	74.3			744	744	553	66.1

** PROBLEMS/SOLUTIONS/COMMENTS

THE A AND B MODULES WERE OFF THREE AND FOUR TIMES, RESPECTIVELY, DURING THE MONTH FOR REPAIR OF WALL WASH HEADER LEAKS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	A	46.1	42.5	54.3	42.5						
	B	58.7	50.9	65.2	50.9						
	SYSTEM	52.4	46.8	59.9	46.8			744	744	348	75.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM DID NOT OPERATE DURING THE FIRST PART OF THE MONTH AS A RESULT OF A THICKENER OVERLOAD.

OTHER MISCELLANEOUS OUTAGES DURING THE MONTH OCCURRED TO CHANGE A WALL WASH HEADER GASKET ON MODULE B AND TO CORRECT HIGH BOOSTER FAN VIBRATION ON MODULE A.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTH OF SEPTEMBER WAS NOT AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SOUTHERN INDIANA GAS & ELEC	
PLANT NAME	A.B. BROWN	
UNIT NUMBER	1	
CITY	WEST FRANKLIN	
STATE	INDIANA	
GROSS UNIT GENERATING CAPACITY - MW	265	
NET UNIT GENERATING CAPACITY W/FGD - MW	250	
EQUIVALENT SCRUBBED CAPACITY - MW	265	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	25819.	(11100 BTU/LB)
AVERAGE ASH CONTENT - %	9.40	
AVERAGE MOISTURE CONTENT - %	13.30	
AVERAGE SULFUR CONTENT - %	3.35	
AVERAGE CHLORIDE CONTENT - %	.05	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	DUAL ALKALI	
SYSTEM SUPPLIER	FMC	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50	
SO2 DESIGN REMOVAL EFFICIENCY - %	85.00	
ENERGY CONSUMPTION - %	.8	
COMMERIAL START-UP DATE	4/79	
INITIAL START-UP DATE	3/79	
CONTRACT AWARDED	12/76	
*** SLUDGE		
** TREATMENT		
METHOD	DEWATERED	
** DISPOSAL		
TYPE	LANDFILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	20.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.3	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	99.3	98.9	98.9	98.9						
	B	99.3	98.8	98.8	98.8						
	SYSTEM	99.3	98.9	98.9	98.9			744	744	736	61.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY OUTAGE TIME OCCURRED DUE TO ELECTRICAL MALFUNCTIONS OF THE SLAKE FEEDER.

ADDITIONAL PROBLEMS WERE ENCOUNTERED WITH DRIFTING OF THE PH MEASUREMENT SYSTEM.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	99.0	99.0	99.0	99.0						
	B	99.6	99.6	99.6	99.6						
	SYSTEM	99.3	99.3	99.3	99.3			672	672	667	56.8

SOUTHERN INDIANA GAS & ELEC: A B. BROWN 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY MODULES A AND B WERE DOWN FOR THREE HOURS DUE TO LIME TRANSFER SYSTEM PROBLEMS.

MODULE A REQUIRED AN ADDITIONAL FOUR HOURS OF DOWNTIME DUE TO PROBLEMS WITH THE RECIRCULATION PUMPS AND ASSOCIATED DISCHARGE VALVES.

MAINTENANCE WAS NECESSARY ON THE VACUUM FILTERS AND THE SLUDGE DISPOSAL TRUCKS DURING THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	89.4	79.5	83.4	78.1			744	731	630	59.8
	B	97.9	92.7	92.7	91.1						
	SYSTEM	93.6	86.1	88.2	84.6						

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH A LOW CHEMICAL CONCENTRATION IN THE FGD SYSTEM CAUSED BY PREPARATION FOR A FIVE WEEK TURBINE OVERHAUL RESULTED IN SOME OUTAGE TIME.

ADDITIONAL DOWN TIME WAS DUE TO PROBLEMS ENCOUNTERED WITH THE ID FAN.

MODULE A EXPERIENCED SOME OUTAGE TIME DUE TO FAILURE OF THE RECIRCULATION PUMP LINING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	A	100.0	.0		.0			720	87	0	5.5
	B	100.0	.0		.0						
	SYSTEM	100.0	.0		.0						

** PROBLEMS/SOLUTIONS/COMMENTS

IN PREPARATION FOR A SCHEDULED FIVE-WEEK TURBINE/GENERATOR OUTAGE, THE SODA ASH PLANT WAS SHUTDOWN AT THE END OF MARCH. THE BOILER REMAINED ON LINE FOR 87 HOURS AT THE BEGINNING OF APRIL; HOWEVER, THE FGD SYSTEM WAS NOT OPERATED DUE TO THE LACK OF SODA ASH, PRECLUDING THE POSSIBILITY OF MEETING EMISSION LIMITATIONS.

DURING THE OVERHAUL THE LINING WAS REPLACED IN THE BYPASS DUCT, A SLAKER GRIT REMOVAL SLUICING SYSTEM WAS INSTALLED AND A DRAIN RECOVERY SYSTEM WAS ADDED.

THE MIST ELIMINATORS WERE REPLACED CAUSING INTERNAL AND EXTERNAL PIPING CHANGES FOR THE MIST ELIMINATOR WASH HEADERS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	A	86.7	79.5	80.9	49.6			744	464	376	35.9
	B	88.7	82.5	84.0	51.5						
	SYSTEM	87.7	81.0	82.4	50.5						

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE TURBINE-GENERATOR OUTAGE, WHICH LASTED UNTIL MAY 12, THE CAST-IRON TEES ADJACENT TO THE DOWNSTREAM SIDE OF THE REGENERATION PUMP DISCHARGE VALVES WERE REPLACED WITH A HIGH DENSITY PLASTIC MATERIAL. THIS ACCOUNTED FOR 46 HOURS OF DOWN TIME.

TWO INSTANCES ACCOUNTING FOR SOME ADDITIONAL OUTAGE TIME WAS CAUSED BY A MALFUNCTION OF THE LIME TRANSFER SYSTEM.

A PROBLEM WITH THE LIME REACTOR PH MEASUREMENT SYSTEM AND THE REPAIR OF A RECIRCULATION PUMP ACCOUNTED FOR ADDITIONAL SYSTEM DOWN TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	A	99.9	99.2	99.2	99.6						

SOUTHERN INDIANA GAS & ELEC: A.B. BROWN 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	B	99.8	98.1	99.1	96.5						
	SYSTEM	99.9	98.6	99.1	97.0			720	708	699	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE RECIRCULATION PUMP TRIPS ACCOUNTED FOR THE UNAVAILABILITY.

THE LIME SLAKERS, THE LIME TRANSFER SYSTEM AND THE ROTARY VACUUM FILTERS WERE CONSTANT PROBLEMS DURING THE MONTH BUT THE SPARE CAPACITY ENABLED CONTINUED OPERATION.

7/81	A	100.0	91.3	96.3	91.3						
	B	82.8	77.4	78.9	77.4						
	SYSTEM	91.4	84.3	87.4	84.3			744	744	627	62.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JULY, THE B MODULE WAS UNAVAILABLE FOR 128 HOURS AS A RESULT OF PROBLEMS WITH THE RECIRCULATION PUMPS. REPLACEMENT LINERS HAD NOT BEEN RECEIVED.

8/81	A	99.9	97.0	97.0	96.6						
	B	84.7	81.8	81.8	81.5						
	SYSTEM	92.3	89.4	89.4	89.0			744	741	662	52.6

** PROBLEMS/SOLUTIONS/COMMENTS

THE UNAVAILABILITY OF THE B MODULE DURING THE MONTH RESULTED FROM CONTINUING PROBLEMS WITH THE RECIRCULATION PUMP LINERS.

FREQUENT BREAKDOWNS OF THE LIME PROCESSING EQUIPMENT (SLAKER AND PNEUMATIC TRANSFER SYSTEM) LED TO NUMEROUS SHORT TERM PERIODS DURING THE MONTH WHEN THE FLUE GAS WAS NOT TREATED.

9/81	A	97.5	97.3	97.3	90.3						
	B	97.5	97.3	90.3	90.3						
	SYSTEM	97.5	97.3	90.3	90.3			720	668	650	45.5

** PROBLEMS/SOLUTIONS/COMMENTS

THE BOILER WAS TAKEN OFF LINE ON THE WEEKEND OF SEPTEMBER 18 TO FIX SEVERAL STEAM LEAKS. THE UNIT CAME BACK ON LINE ON SEPTEMBER 21, BUT THE LIME REACTOR AGITATOR MOTOR WOULD NOT OPERATE AND REQUIRED REPLACEMENT. THIS ACCOUNTED FOR THE FGD SYSTEM UNAVAILABILITY DURING THE MONTH.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SPRINGFIELD CITY UTILITIES	
PLANT NAME	SOUTHWEST	
UNIT NUMBER	1	
CITY	SPRINGFIELD	
STATE	MISSOURI	
GROSS UNIT GENERATING CAPACITY - MW	194	
NET UNIT GENERATING CAPACITY W/FGD - MW	173	
EQUIVALENT SCRUBBED CAPACITY - MW	194	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	26749.	(11500 BTU/LB)
AVERAGE ASH CONTENT - %	13.00	
AVERAGE MOISTURE CONTENT - %	9.00	
AVERAGE SULFUR CONTENT - %	3.50	
AVERAGE CHLORIDE CONTENT - %	.30	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	AIR CORRECTION DIVISION, UOP	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.70	
SO2 DESIGN REMOVAL EFFICIENCY - %	80.00	
ENERGY CONSUMPTION - %	4.6	
COMMERIAL START-UP DATE	9/77	
INITIAL START-UP DATE	4/77	
CONTRACT AWARDED	8/73	
*** SLUDGE		
** TREATMENT		
METHOD	STABILIZATION	
** DISPOSAL		
TYPE	LANDFILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	20.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.3	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	S-1	41.9	41.2		41.1						
	S-2	73.1	66.3		66.1						
	SYSTEM	57.5	53.7	71.4	53.6	35.60		744	742	399	67.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY MODULES S-1 AND S-2 ENCOUNTERED ELECTRICAL PROBLEMS IN THE DEWATERING AREA AND PROGRAMMABLE CONTROLLER MALFUNCTIONS.

THE RECYCLE SPRAY NOZZLES ON THE S-1 MODULE PLUGGED CAUSING SOME OUTAGE TIME.

ADDITIONAL FGD SYSTEM PROBLEMS DURING THE MONTH INCLUDED SLURRY MAKE-UP LINE PLUGGING, A BROKEN SUPERNATANT LINE, AND AN I.D. FAN EXPANSION JOINT FAILURE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	S-1	55.3	53.6	54.4	53.0						

SPRINGFIELD CITY UTILITIES: SOUTHWEST 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	S-2	36.9	32.7	37.1	32.3						
	SYSTEM	46.1	43.1	45.8	42.6	27.00		672	664	287	71.8

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY MODULE S-1 WAS OFF LINE PART OF THE MONTH DUE TO FAILURE OF THE EXPANSION JOINT IN THE RECYCLE PUMP DISCHARGE LINE.

MODULE S-2 EXPERIENCED PROBLEMS DUE TO PLUGGING IN THE BALL-CAGE, PRESATURATOR AREA, AND THE RECYCLE NOZZLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE MONTH OF MARCH IS NOT AVAILABLE AT THIS TIME.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	S-1	47.5	62.1	64.8	46.3						
	S-2	73.5	97.2	97.2	72.4						
	SYSTEM	60.5	79.6	81.3	59.3			720	536	427	59.4

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL A SUPERNATANT PIPE FAILURE CAUSED SOME OUTAGE TIME FOR BOTH MODULES.

A BOILER TRIP ON APRIL 23 CAUSED A HIGH TEMPERATURE CONDITION ON BOTH MODULES. THE MODULES WERE INSPECTED AND S-2 WAS RETURNED TO SERVICE AND S-1 REMAINED OFF LINE DUE TO DAMAGE TO THE SCRUBBER SPHERES.

SOME DOWN TIME RESULTED DUE TO PROGRAMMABLE CONTROLLER PROBLEMS. THE S-1 MODULE'S INTERNALS WERE INSPECTED BY RADIAN CORP.

MODULE S-2 TRIPPED DUE TO AN EQUIPMENT FAILURE WHILE SWITCHING RECYCLE PUMPS AND WENT OFF LINE TWICE DUE TO THE LOSS OF ELECTRICAL POWER IN THE DEWATERING AND SUPERNATANT PUMPS AREA.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	S-1	44.9	86.9	99.3	36.6						
	S-2	42.6	61.3	82.1	25.8						
	SYSTEM	43.7	74.3	91.4	31.2			744	313	232	27.2

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MAY THE BOILER REMAINED OUT OF SERVICE THROUGH MAY 18, FOR A SCHEDULED MAINTENANCE OUTAGE.

MODULE S-1 WAS OUT OF SERVICE APPROXIMATELY 410 HOURS DUE TO PROGRAMMABLE CONTROLLER POWER PROBLEMS.

MODULE S-2 EXPERIENCED 427 HOURS OF OUTAGE TIME DUE TO DEWATERING PROBLEMS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	S-1	76.3	77.9	82.3	62.6						
	S-2	79.2	72.9	84.9	58.5						
	SYSTEM	77.8	75.4	83.5	60.6	56.30		720	579	436	58.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JUNE THE SYSTEM WAS DOWN PART OF THE TIME DUE TO LIMESTONE CONVEYOR PROBLEMS.

THE UNIT WAS OUT OF SERVICE FOR ABOUT SIX DAYS IN JUNE FOR MAINTENANCE.

BOTH MODULES EXPERIENCED OUTAGES DUE TO ELECTRICAL PROBLEMS CAUSED BY LIGHTNING.

SPRINGFIELD CITY UTILITIES: SOUTHWEST 1 (CONT.)

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	S-1	94.9	90.9	98.1	90.9						
	S-2	98.3	94.5	94.5	94.5			744	744	690	78.1
	SYSTEM	96.6	92.7	96.3	92.7						

** PROBLEMS/SOLUTIONS/COMMENTS

THE ONLY SIGNIFICANT FGD SYSTEM OUTAGE DURING JULY WAS NECESSARY FOR MODIFICATION OF THE S-1 TRAYS. BOTH MODULES WERE REMOVED FROM SERVICE TO PERMIT ENTRY INTO THE MODULE.

MINOR PUMP AND PIPING PROBLEMS WERE ENCOUNTERED DURING THE MONTH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	S-1	100.0	100.0	100.0	100.0						
	S-2	96.2	74.7	80.5	74.7			744	744	650	82.3
	SYSTEM	98.1	87.4	90.3	87.4						

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE MONTH, ONE OF THE CONVEYOR BELTS USED FOR SLUDGE REMOVAL WAS STRUCK BY A TRUCK AND DAMAGED. SOME MINOR PROBLEMS RESULTED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	S-1	89.4	79.9	88.6	79.9						
	S-2	87.6	75.6	81.1	75.6			720	720	544	67.4
	SYSTEM	88.5	77.8	84.9	75.6						

** PROBLEMS/SOLUTIONS/COMMENTS

THE SLUDGE CONVEYOR REMAINED OUT OF SERVICE DURING THE MONTH AS A RESULT OF DAMAGE FROM A TRUCK ACCIDENT. THIS CAUSED THE MAJORITY OF THE FGD SYSTEM OUTAGE TIME DURING THE MONTH.

SLURRY CARRYOVER IN THE RECYCLED SUPERNATANT WATER CAUSED NOZZLE PLUGGAGE AND OUTAGE TIME ON BOTH MODULES DURING THE MONTH.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	SPRINGFIELD WATER, LIGHT & PWR
PLANT NAME	DALLMAN
UNIT NUMBER	3
CITY	SPRINGFIELD
STATE	ILLINOIS
GROSS UNIT GENERATING CAPACITY - MW	205
NET UNIT GENERATING CAPACITY W/FGD - MW	192
EQUIVALENT SCRUBBED CAPACITY - MW	185
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	24423. (10500 BTU/LB)
AVERAGE ASH CONTENT - %	8.30
AVERAGE MOISTURE CONTENT - %	17.50
AVERAGE SULFUR CONTENT - %	3.30
AVERAGE CHLORIDE CONTENT - %	.11
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	95.00
ENERGY CONSUMPTION - %	4.9
COMMERIAL START-UP DATE	0/81
INITIAL START-UP DATE	12/80
CONTRACT AWARDED	12/77
*** SLUDGE	
** TREATMENT	
METHOD	FORCED OXIDATION
** DISPOSAL	
TYPE	LANDFILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	20.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.3

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	A	93.5	93.5	93.5	93.5						
	B	22.6	22.6	22.6	22.6						
	SYSTEM	58.1	58.1	58.1	58.1			744	744	432	79.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY SOME OUTAGE TIME WAS DUE TO PH EXCURSIONS IN THE QUENCHER SECTIONS THAT NECESSITATED THE INSPECTION OF BOTH MODULES.

ACCUMULATION OF FLY ASH AND SULFITE PARTICLES LED TO THE REPLACEMENT OF SOME PACKING MATERIAL IN MODULE B.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
2/81	A	.0	.0	.0	.0						
	B	100.0	95.0	95.0	80.2						
	SYSTEM	50.0	47.6	47.6	40.2	94.00	98.30	672	567	270	68.6

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

DURING FEBRUARY THE BOILER WAS OUT OF SERVICE APPROXIMATELY 49 HOURS.

MODULE A REMAINED OUT OF SERVICE DUE TO INADEQUATE PACKING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	A	.0	.0		.0						
	B	100.0	91.5	91.5	38.7						
	SYSTEM	50.0	45.7	45.7	19.4	94.00	98.34	744	315	144	31.5

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH APPROXIMATELY 429 HOURS OF OUTAGE TIME WAS DUE TO THE CONDENSER TUBES BEING REPLACED.

MODULE A WAS NOT AVAILABLE DURING MARCH DUE TO INADEQUATE PACKING.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM	.0	.0		.0			720	78	0	4.0

** PROBLEMS/SOLUTIONS/COMMENTS

DURING APRIL THE BOILER WAS OUT OF SERVICE APPROXIMATELY 642 HOURS DUE TO A SCHEDULED MAINTENANCE OVERHAUL.

THE FGD SYSTEM WAS UNAVAILABLE THE ENTIRE MONTH TO FACILITATE REPAIRS TO PROCESS PIPING, REPLACEMENT OF THE PACKING MATERIAL IN THE ABSORBER TOWERS, INSTALLATION OF THE STRAINER SYSTEMS ON ABSORBER FEED TANK AND MAKEUP WATER SYSTEM, AND REPAIR MINOR CORROSION DAMAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
5/81	A	39.5	33.5	33.5	27.3						
	B	40.7	3.6	3.6	3.0						
	SYSTEM	40.1	18.6	18.6	15.1			744	606	113	50.0

** PROBLEMS/SOLUTIONS/COMMENTS

FROM MAY 1 TO MAY 18 THE SYSTEM WAS UNAVAILABLE SO THAT THE HYDROCLONE FRP LINE COULD BE REPLACED WITH CARBON STEEL FOR MODULE B AND RUBBER FOR MODULE A.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
6/81	A	53.1	58.2	58.2	53.1						
	B	39.2	42.9	42.9	39.2						
	SYSTEM	46.2	50.6	50.6	46.2			720	657	333	63.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE FGD SYSTEM WAS REMOVED FROM SERVICE TWICE DURING THE MONTH DUE TO PROBLEMS WITH THE ELECTROSTATIC PRECIPITATOR.

BOTH TOWERS WERE TAKEN OUT OF SERVICE ON JUNE 19 DUE TO WET WELL HYDROCLONE PROBLEMS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	A	40.6	29.8	29.8	28.6						
	B	67.6	57.9	57.9	55.6						
	SYSTEM	54.1	43.9	43.9	42.1			744	715	313	69.0

** PROBLEMS/SOLUTIONS/COMMENTS

MODULE A WAS REMOVED FROM SERVICE FOR PART OF THE MONTH FOR CLEANING THAT WAS NECESSITATED BY PLUGGED PACKING.

THE MODULE B DOWNTIME DURING THE MONTH WAS ATTRIBUTED TO INSPECTIONS AND CLEANING OF THE PACKING, NOZZLES, AND HEADERS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
8/81	SYSTEM	.0	.0	.0	.0			744	709	0	69.0

SPRINGFIELD WATER, LIGHT & PWR: DALLMAN 3 (CONT.)

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-----------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
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      ** PROBLEMS/SOLUTIONS/COMMENTS

                          BOTH MODULES WERE UNAVAILABLE DURING AUGUST AS THE PACKING WAS REPLACED
                          IN BOTH TOWERS.

 9/81  SYSTEM                                                                 720

      ** PROBLEMS/SOLUTIONS/COMMENTS

                          INFORMATION FOR THE MONTH OF SEPTEMBER WAS NOT AVAILABLE.
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SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	ST. JOE ZINC
PLANT NAME	G.F. WEATON
UNIT NUMBER	1
CITY	MONACA
STATE	PENNSYLVANIA
GROSS UNIT GENERATING CAPACITY - MW	60
NET UNIT GENERATING CAPACITY W/FGD - MW	495
EQUIVALENT SCRUBBED CAPACITY - MW	60

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	BITUMINOUS	
AVERAGE HEAT CONTENT - J/G	29075.	(12500 BTU/LB)
AVERAGE ASH CONTENT - %	11.50	
AVERAGE MOISTURE CONTENT - %	********	
AVERAGE SULFUR CONTENT - %	2.00	
AVERAGE CHLORIDE CONTENT - %	.20	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	CITRATE
SYSTEM SUPPLIER	MORRISON & KNUDSEN/U.S.B.M.
NEW/RETROFIT	RETROFIT
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.60
SO2 DESIGN REMOVAL EFFICIENCY - %	90.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	1/80
INITIAL START-UP DATE	11/79
CONTRACT AWARDED	**/**

*** SALEABLE BYPRODUCT

BYPRODUCT NATURE	ELEMENTAL SULFUR
DISPOSITION	******

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/80	SYSTEM	11.9	11.9	11.9	11.9			720	720	86	36.7

** PROBLEMS/SOLUTIONS/COMMENTS

STARTUP BEGAN LATE IN SEPTEMBER DUE TO A LONG DOWN PERIOD NECESSARY TO MAKE REPAIRS AND REMOVE ALL BUT TWO FEET OF THE PACKING FROM THE ABSORBER TOWER. THIS WAS NECESSARY DUE TO SULFUR BLOCKAGE OF THE PACKING CAUSED BY POOR SULFUR FLOTATION, WHICH IS THOUGHT TO BE DUE TO LOW TEMPERATURES OCCASIONED BY RUNNING THE PLANT AT ONLY ABOUT ONE THIRD THE DESIGN RATE. THE PLANT IS STILL OPERATING AT REDUCED RATES.

DURING SEPTEMBER NUMEROUS FAILURES OF THE RUBBER LINED PRE-SCRUBBER PIPING CAUSED SOME OUTAGE TIME.

FAILURE OF SEVERAL PUMPS CAUSED ADDITIONAL OUTAGE TIME.

DURING SEPTEMBER FAILURE OF SEVERAL AGITATORS OCCURRED.

FAILURE OF THREE HEAT EXCHANGERS WAS EXPERIENCED CAUSING ADDITIONAL DOWN TIME.

ST. JOE ZINC: G.F. WEATON 1 (CONT.)

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------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
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AN UNDERSIZED STEAM SUPPLY LINE TO THE PLANT HAD TO BE REPLACED.

REPAIRS WERE MADE TO THE PLASTIC LININGS OF SEVERAL STEEL SOLUTION TANKS.

LEAKS IN THE SULFUR MELTERS AND THE TEFLON LINED PIPES AROUND THE MELTER CIRCUIT CAUSED ADDITIONAL OUTAGE TIME.

```
10/80  SYSTEM      37.5         37.5        37.5        37.5                     744   744    279  41.0
```

** PROBLEMS/SOLUTIONS/COMMENTS

DURING OCTOBER THE PLANT CONTINUED TO OPERATE AT LOW CAPACITY DUE TO LACK OF DEMAND. THE SO2 ABSORPTION VARIED FROM 84% TO 94% WITH ALL EQUIPMENT FUNCTIONAL. THE ABSORBER CONTINUED TO OPERATE WITH ONLY TWO FEET OF PACKING IN THE VESSEL.

TROUBLES WITH THE SULFUR FLOTATION CONTINUED DURING OCTOBER CAUSING SOME OUTAGE TIME.

A SYSTEM OUTAGE WAS DUE TO A DAMAGED REACTOR AGITATOR SEAL CAUSING ONE OF THE REACTORS TO BE SHUT DOWN AND BY-PASSED. WHEN THIS OCCURRED SO2 ABSORPTION FELL TO 72%.

PROBLEMS WERE ENCOUNTERED WHEN THE RUBBER LINED PRESCRUBBER PIPING FAILED.

```
11/80  SYSTEM      13.9         13.9        13.9        13.9                     720   720    100  43.0
```

** PROBLEMS/SOLUTIONS/COMMENTS

DURING NOVEMBER AN ANNUAL BOILER INSPECTION OF THE HYDROGEN SULFITE STEAM GENERATOR DRUM WAS PERFORMED.

THE RUBBER LINED PRESCRUBBER PIPING WAS REPAIRED DURING NOVEMBER.

A HEATER WAS INSTALLED FOR THE SCRUBBER WATER ADDITION DURING THE MONTH.

THE NEUTRALIZER SUMP PUMP WAS CLEANED AND PUT BACK IN OPERATION.

DURING NOVEMBER EXTENSIVE WATER DILUTION OF THE CITRATE SOLUTION DURING DOWNTIME CAUSED THE SO2 ABSORPTION TO BE LOWER THAN OCTOBER. IT VARIED FROM 71% TO 82%. THE PLANT CAPACITY FACTOR WAS UP A LITTLE DURING THE MONTH.

```
12/80  SYSTEM      24.9         24.9        24.9        24.9                     744   744    185  46.0
```

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER WATER DILUTION CONTINUED TO BE A PROBLEM AS THE GAS TEMPERATURES WERE NOT SUFFICIENTLY HIGH ENOUGH TO EVAPORATE ENOUGH WATER. THE SO2 ABSORPTION WAS POOR, ABOUT 65%, DUE TO THE CITRATE SOLUTION BEING TOO DILUTE.

ON DECEMBER 8, 1981 A REGENERATION REACTOR AGITATOR SHAFT BROKE RESULTING IN THE LOSS OF ONE HALF OF THE REGENERATION SYSTEM. THIS CAUSED THE SO2 ABSORPTION TO DECREASE. THE SYSTEM WAS SHUT DOWN ON DECEMBER 12, 1981 AFTER LEAKS DEVELOPED IN THE SCRUBBER RECIRCULATION LINES.

THE DEMONSTRATION PLANT WILL REMAIN SHUT DOWN UNTIL THE ABSORBER IS CONVERTED TO A SPRAY TOWER AND REPAIRS ARE MADE TO BOTH REGENERATION REACTOR AGITATORS.

```
 1/81  SYSTEM        .0           .0                     .0                     744   744      0  51.0
```

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----------------------------------------PERFORMANCE DATA----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION % REMOVAL  PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
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       ** PROBLEMS/SOLUTIONS/COMMENTS

                               DURING JANUARY THE CITRATE PROCESS DEMONSTRATION PLANT DID NOT OPERATE.
                               DURING THIS TIME ALL THE SOLUTION TO THE MAIN STORAGE TANKS WAS DRAINED TO
                               PREVENT FREEZE UP.  A STEAM COIL WAS INSTALLED IN THE CITRATE STORAGE TANK
                               TO PREVENT FREEZE UP.  PLANS ARE BEING MADE FOR THE MODIFICATION OF THE
                               ABSORBER TO A SPRAY TOWER.

 2/81  SYSTEM         .0          .0                      .0                      672   672      0  54.0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                               THE CITRATE PROCESS DEMONSTRATION PLANT DID NOT OPERATE DURING FEBRUARY.
                               REPAIRS TO THE REACTOR AGITATORS BEGAN AND PARTS FOR THE SPRAY TOWER MODI-
                               FICATION OF THE ABSORBER WERE FABRICATED.  OPERATION OF THE DEMONSTRATION
                               PLANT WILL RESUME WHEN THE REPAIRS AND MODIFICATIONS ARE COMPLETED.

 3/81  SYSTEM         .0          .0                      .0                      744   744      0  60.0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                               THE CITRATE PROCESS DEMONSTRATION PLANT DID NOT OPERATE DURING MARCH.  THE
                               MODIFICATION OF THE ABSORBER WAS COMPLETED.  OPERATION OF THE PLANT IS
                               PLANNED TO RESUME IN APRIL.

 4/81  SYSTEM       10.6        10.6        10.6        10.6  91.00               720   719     76  52.9

       ** PROBLEMS/SOLUTIONS/COMMENTS

                               THE FGD SYSTEM OPERATED FOR 76 HOURS DURING APRIL.  AVERAGE SO2 ABSORPTION
                               WAS 91%.  OPERATION OF THE SPRAY TOWER WAS CONSIDERED A SUCCESS ALTHOUGH
                               THE OPERATION TIME WAS SHORT.  SULFUR FLOTATION AND RECOVERY WERE IMPROVED
                               OVER PREVIOUS RUNS.  THE RUN WAS TERMINATED BECAUSE OF LEAKING PACKING
                               GLANDS ON THE PRESATURATOR PUMPS AND FAILURE OF ONE OF THE H2S GENERATOR
                               VESSELS.  UPON SHUTDOWN IT WAS DISCOVERED THAT ANOTHER VESSEL HAD BEEN
                               WEAKENED BY EXCESSIVE HEAT AND CORROSION AND WOULD REQUIRE REPLACEMENT.
                               THE SYSTEM IS SHUTDOWN PENDING REPLACEMENT OF THE MODULES.  MODIFICATION
                               OF THE SCRUBBER PUMPS IS ALSO BEING PERFORMED TO GIVE MORE RELIABLE
                               SERVICE.

 5/81  SYSTEM         .0          .0                      .0                      744   668      0  66.0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                               THE SYSTEM REMAINED OFF-LINE DURING MAY PENDING REPLACEMENT OF THE MODULES.

 6/81  SYSTEM         .0          .0          .0          .0                      720   720      0  61.3

       ** PROBLEMS/SOLUTIONS/COMMENTS

                               THE CITRATE PROCESS DEMONSTRATION PLANT DID NOT OPERATE DURING JUNE. IT IS
                               TO REMAIN SHUT DOWN UNTIL TWO NEW PROCESS VESSELS CAN BE FABRICATED AND
                               INSTALLED. DURING THE SHUTDOWN, ALL FOUR OF THE PRE-SCRUBBER CIRCULATING
                               PUMPS WILL BE MODIFIED AND TWO HZS GENERATORS (WHICH HAD DEVELOPED LEAKS)
                               WILL BE REPLACED. A NUMBER OF VALVES WILL ALSO BE REPLACED.

 7/81  SYSTEM         .0          .0          .0          .0                      744   375      0  59.0

 8/81  SYSTEM         .0          .0          .0          .0                      744   743      0  54.3
```

ST. JOE ZINC: G.F. WEATON 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

THE CITRATE PROCESS DEMONSTRATION PLANT REMAINED SHUTDOWN THROUGH JULY AND AUGUST.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM	4.9	5.3	4.9	4.9			720	666	35	61.0

** PROBLEMS/SOLUTIONS/COMMENTS

THE CITRATE DEMONSTRATION PLANT OPERATED A TOTAL OF 35 HOURS IN SEPTEMBER. ONE OPERATING PERIOD OF 10 HOURS WAS TERMINATED BECAUSE OF FAILURE OF THE ABSORBER LEVEL CONTROL INSTRUMENT. THE SECOND OPERATING PERIOD OF 25 HOURS WAS TERMINATED BECAUSE OF A LEAK IN THE SULFUR FEED LINE TO THE H2S GENERATOR. PROBLEMS WITH TRANSFER OF SULFUR TO THE H2S GENERATOR WERE HOLDING UP OPERATION OF THE PLANT.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

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COMPANY NAME                                     TENNESSEE VALLEY AUTHORITY
PLANT NAME                                       SHAWNEE
UNIT NUMBER                                      10A
CITY                                             PADUCAH
STATE                                            KENTUCKY
GROSS UNIT GENERATING CAPACITY - MW                 10
NET UNIT GENERATING CAPACITY W/FGD - MW             10
EQUIVALENT SCRUBBED CAPACITY - MW                   10

** FUEL DATA
    FUEL TYPE                                    COAL
    FUEL GRADE                                   BITUMINOUS
    AVERAGE HEAT CONTENT - J/G                   *******        (****** BTU/LB)
    AVERAGE ASH CONTENT - %                      ********
    AVERAGE MOISTURE CONTENT - %                 ********
    AVERAGE SULFUR CONTENT - %                       2.90
    AVERAGE CHLORIDE CONTENT - %                 ********

*** FGD SYSTEM

 ** GENERAL DATA
    PROCESS TYPE                                 LIME/LIMESTONE
    SYSTEM SUPPLIER                              AIR CORRECTION DIVISION, UOP
    NEW/RETROFIT                                 RETROFIT
    PARTICULATE DESIGN REMOVAL EFFICIENCY - %    ********
    SO2 DESIGN REMOVAL EFFICIENCY - %               90.00
    ENERGY CONSUMPTION - %                       *******
    COMMERIAL START-UP DATE                      **/**
    INITIAL START-UP DATE                         4/72
    CONTRACT AWARDED                             **/**

*** SLUDGE

 ** TREATMENT
    METHOD                                       DEWATERED

 ** DISPOSAL
    TYPE                                         LANDFILL

 ** FGD SPARE CAPACITY INDICES
    ABSORBER - %                                       .0

 ** FGD SPARE COMPONENT INDICES
    ABSORBER                                           .0


-----------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
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 0/81  SYSTEM

      ** PROBLEMS/SOLUTIONS/COMMENTS

                  REFER TO THE PERFORMANCE UPDATE INFORMATION FOR SHAWNEE 10B.
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SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

```
COMPANY NAME                                      TENNESSEE VALLEY AUTHORITY
PLANT NAME                                        SHAWNEE
UNIT NUMBER                                       10B
CITY                                              PADUCAH
STATE                                             KENTUCKY
GROSS UNIT GENERATING CAPACITY - MW                  10
NET UNIT GENERATING CAPACITY W/FGD - MW              10
EQUIVALENT SCRUBBED CAPACITY - MW                    10

** FUEL DATA
    FUEL TYPE                                     COAL
    FUEL GRADE                                    BITUMINOUS
    AVERAGE HEAT CONTENT   J/G                    *******        (****** BTU/LB)
    AVERAGE ASH CONTENT - %                       ********
    AVERAGE MOISTURE CONTENT - %                  ********
    AVERAGE SULFUR CONTENT - %                        2.90
    AVERAGE CHLORIDE CONTENT - %                  ********

*** FGD SYSTEM

** GENERAL DATA
    PROCESS TYPE                                  LIME/LIMESTONE
    SYSTEM SUPPLIER                               GE ENVIRONMENTAL SERVICES
    NEW/RETROFIT                                  RETROFIT
    PARTICULATE DESIGN REMOVAL EFFICIENCY - %     ********
    SO2 DESIGN REMOVAL EFFICIENCY - %                90.00
    ENERGY CONSUMPTION - %                        *******
    COMMERIAL START-UP DATE                       **/**
    INITIAL START-UP DATE                          4/72
    CONTRACT AWARDED                              **/**

*** SLUDGE

** TREATMENT
    METHOD                                        DEWATERED

** DISPOSAL
    TYPE                                          LANDFILL

** FGD SPARE CAPACITY INDICES
    ABSORBER - %                                          .0

** FGD SPARE COMPONENT INDICES
    ABSORBER                                              .0


------------------------------------------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 1/81  SYSTEM                                                                744

 2/81  SYSTEM                                                                672

 3/81  SYSTEM                                                                744
```

** PROBLEMS/SOLUTIONS/COMMENTS

A LONG-TERM RELIABILITY TEST (RUN 917-1A) THAT WAS STARTED DECEMBER 26, 1980, ON THE SPRAY TOWER SYSTEM (TRAIN 100) WAS COMPLETED MARCH 13, 1981, AFTER 1688 ONSTREAM HOURS. THE DAILY AVERAGE SO2 REMOVAL RANGED FROM 92% TO 94%.

THE LONG-TERM TEST WAS CONDUCTED WITH LIMESTONE SLURRY ENHANCED WITH 1300 TO 1700 PPM ADIPIC ACID, WITH TWO-TANK CONFIGURATION, AND WITH FORCED OXIDATION. THE SCRUBBER INLET PH WAS CONTROLLED AT 5.0-5.1. THE SLURRY RECIRCULATION RATE WAS CONSTANT AT 2400 GPM, AND THE FLUE GAS FLOW RATE WAS VARIED BETWEEN 20,000 TO 35,000 ACFM (300 F) TO SIMULATE A TYPICAL DAILY

PERFORMANCE DATA

BOILER LOAD CYCLE. THE L/G RANGE CORRESPONDING TO THE VARYING GAS FLOW WAS 65 TO 150 GAL/MCF. LIMESTONE UTILIZATION WAS ABOUT 92%. SULFITE OXIDATION AVERAGED 99.8% AND THE FILTER CAKE SOLIDS CONTENT AVERAGED 87%. THE SYSTEM OPERATED 1688 HOURS OUT OF A POSSIBLE 1766 HOURS (EXCLUDING 84 HOURS BOILER RELATED OUTAGE), OR 95.6% OF AVAILABLE TIME. THERE WAS NO SIGN OF SCALING OR PLUGGING WITHIN THE SPRAY TOWER OR THE MIST ELIMINATOR.

AFTER THE LONG-TERM TEST, ADDITIONAL LIMESTONE/ADIPIC ACID FACTORIAL TESTS, INCLUDING TESTS TO INVESTIGATE THE EFFECT OF SPRAY HEADER POSITION, WERE CONDUCTED ON TRAIN 100 DURING THE REMAINDER OF THE FIRST QUARTER 1981.

TRAIN 200 (TCA) HAS BEEN SHUT DOWN SINCE JANUARY 7, 1981, AFTER TESTING WITH GLITSCH GRID PACKING.

TRAIN 300 (COCURRENT SCRUBBER) REMAINED IDLE DURING THE PERIOD.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE SECOND QUARTER 1981 WAS NOT AVAILABLE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INFORMATION FOR THE THIRD QUARTER 1981 IS NOT YET AVAILABLE.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

```
COMPANY NAME                                TENNESSEE VALLEY AUTHORITY
PLANT NAME                                  WIDOWS CREEK
UNIT NUMBER                                 7
CITY                                        BRIDGEPORT
STATE                                       ALABAMA
REGULATORY CLASSIFICATION                   E
PARTICULATE EMISSION LIMITATION - NG/J         52.          (  .120 LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J                516.          ( 1.200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J              ******          (****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW           1978
GROSS UNIT GENERATING CAPACITY - MW           575
NET UNIT GENERATING CAPACITY W/FGD - MW       575
NET UNIT GENERATING CAPACITY WO/FGD - MW      495
EQUIVALENT SCRUBBED CAPACITY - MW             575

 ** UNIT DATA - BOILER AND STACK
     BOILER SUPPLIER                        ******
     BOILER TYPE                            PULVERIZED COAL
     BOILER SERVICE LOAD                    BASE
     DESIGN BOILER FLUE GAS FLOW - CU.M/S   ********        (******* ACFM)
     BOILER FLUE GAS TEMPERATURE - C        *******         (**** F)
     STACK HEIGHT - M                       ******          (**** FT)
     STACK SHELL                            ******
     STACK TOP DIAMETER - M                 *******         (***** FT)

 ** FUEL DATA
     FUEL TYPE                              COAL
     FUEL GRADE                             BITUMINOUS
     AVERAGE HEAT CONTENT - J/G             25819.          ( 11100 BTU/LB)
     RANGE HEAT CONTENT - BTU/LB                              ******
     AVERAGE ASH CONTENT - %                   17.00
     RANGE ASH CONTENT - %                  ******
     AVERAGE MOISTURE CONTENT - %           ********
     RANGE MOISTURE CONTENT - %             ******
     AVERAGE SULFUR CONTENT - %                 3.70
     RANGE SULFUR CONTENT - %               ******
     AVERAGE CHLORIDE CONTENT - %           ********
     RANGE CHLORIDE CONTENT - %             ******

*** PARTICLE CONTROL

 ** ESP
     NUMBER                                    1

 ** PARTICLE SCRUBBER
     NUMBER                                    4
     GENERIC TYPE                           VENTURI TOWER
     SPECIFIC TYPE                          VARIABLE-THROAT/VERTICALLY-ADJUSTABLE ROD DECKS
     TRADE NAME/COMMON NAME                 ROD SCRUBBER
     GAS CONTACTING DEVICE TYPE             NONE

*** FGD SYSTEM

 ** GENERAL DATA
     SALEABLE PRODUCT/THROWAWAY PRODUCT     THROWAWAY PRODUCT
     SO2 REMOVAL MODE                       WET SCRUBBING
     PROCESS TYPE                           LIMESTONE
     SYSTEM SUPPLIER                        COMBUSTION ENGINEERING
     A-E FIRM                               IN-HOUSE
     DEVELOPMENT LEVEL                      FULL SCALE
     NEW/RETROFIT                           RETROFIT
     UNIT DESIGN SO2 REMOVAL EFFICIENCY - %    80.00
     CURRENT STATUS                            1
     COMMERCIAL START-UP                       9/81
     INITIAL START-UP                          3/81

 ** DESIGN AND OPERATING PARAMETERS
```

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 7 (CONT.)

**** QUENCHER/PRESATURATOR**

CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

**** ABSORBER**

NUMBER	4
GENERIC TYPE	SPRAY TOWER
SPECIFIC TYPE	OPEN COUNTERCURRENT SPRAY
TRADE NAME/COMMON TYPE	N/A
SUPPLIER	COMBUSTION ENGINEERING
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
GAS CONTACTING DEVICE TYPE	NONE
INLET GAS TEMPERATURE - C	48.9 (120 F)

**** MIST ELIMINATOR**

PRE-MIST ELIMINATOR/MIST ELIMINATOR	PRECOLLECTOR
NUMBER PER SYSTEM	4
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONFIGURATION	HORIZONTAL
NUMBER OF STAGES	1
NUMBER OF PASSES PER STAGE	1
DISTANCE BETWEEN STAGES - CM	.76 (.3 IN)
VANE ANGLES - DEGREES	45
CONSTRUCTION MATERIAL GENERIC TYPE	ORGANIC
CONSTRUCTION MATERIAL SPECIFIC TYPE	FIBER-REINFORCED POLYESTER

**** REHEATER**

NUMBER	4
GENERIC TYPE	IN-LINE
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
TEMPERATURE INCREASE - C	27.8 (50 F)
INLET FLUE GAS TEMPERATURE - C	48.9 (120 F)
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR

**** FANS**

NUMBER	4
DESIGN	CENTRIFUGAL
FUNCTION	BOOSTER
APPLICATION	FORCED DRAFT
SERVICE	DRY
CONSTRUCTION MATERIAL GENERIC TYPE	CARBON STEEL

**** DAMPERS**

FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

**** DUCTWORK**

SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR

**** REAGENT PREPARATION EQUIPMENT**

FUNCTION	WET BALL MILL
DEVICE	COMPARTMENTED
DEVICE TYPE	NR

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 7 (CONT.)

** TANKS

SERVICE	NUMBER
SCRUBBER	4
ABSORBER REACTION	4
EFFLUENT SLURRY SURGE	1
LIMESTONE SLURRY STORAGE	1

** PUMPS

SERVICE	NUMBER
LIMESTONE SLURRY FEED	4
VENTURI RECYCLE	8
ABSORBER RECIRCULATION	12

** SOLIDS CONCENTRATING/DEWATERING

DEVICE	NR

*** SLUDGE

** TREATMENT

METHOD	NA
DEVICE	NA
PROPRIETARY PROCESS	NA

** DISPOSAL

NATURE	FINAL
TYPE	POND
SITE TREATMENT	NONE

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL OPERATIONS OF THE WIDOWS CREEK 7 FGD SYSTEM BEGAN IN MARCH, 1981. THE SYSTEM IS PRESENTLY IN A SHAKEDOWN/DEBUGGING PHASE WITH COMMERCIAL OPERATIONS EXPECTED IN EARLY SEPTEMBER.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

INITIAL SHAKEDOWN/DEBUGGING OPERATIONS CONTINUED THROUGH THE SECOND QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

ACCEPTANCE TESTING OF THE WIDOWS CREEK 7 FGD SYSTEM BEGAN IN MID-SEPTEMBER.

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                                       SECTION 3
               DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS
-----------------------------------------------------------------------------------------------------

 COMPANY NAME                                   TENNESSEE VALLEY AUTHORITY
 PLANT NAME                                     WIDOWS CREEK
 UNIT NUMBER                                    8
 CITY                                           BRIDGEPORT
 STATE                                          ALABAMA
 GROSS UNIT GENERATING CAPACITY - MW              550
 NET UNIT GENERATING CAPACITY W/FGD - MW          516
 EQUIVALENT SCRUBBED CAPACITY - MW                550

 ** FUEL DATA
     FUEL TYPE                                  COAL
     FUEL GRADE                                 BITUMINOUS
     AVERAGE HEAT CONTENT - J/G                  23260.        ( 10000 BTU/LB)
     AVERAGE ASH CONTENT - %                        25.00
     AVERAGE MOISTURE CONTENT - %                   10.00
     AVERAGE SULFUR CONTENT - %                      3.70
     AVERAGE CHLORIDE CONTENT - %                     .07

*** FGD SYSTEM

 ** GENERAL DATA
     PROCESS TYPE                               LIMESTONE
     SYSTEM SUPPLIER                            TENNESSEE VALLEY AUTHORITY
     NEW/RETROFIT                               RETROFIT
     PARTICULATE DESIGN REMOVAL EFFICIENCY - %     99.50
     SO2 DESIGN REMOVAL EFFICIENCY - %             70.00
     ENERGY CONSUMPTION - %                         4.7
     COMMERIAL START-UP DATE                     1/78
     INITIAL START-UP DATE                       5/77
     CONTRACT AWARDED                            2/73

*** SLUDGE

 ** TREATMENT
     METHOD                                     BLEED

 ** DISPOSAL
     TYPE                                       POND

 ** FGD SPARE CAPACITY INDICES
     ABSORBER - %                                     .0

 ** FGD SPARE COMPONENT INDICES
     ABSORBER                                         .0


-----------------------------------------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 1/81  SYSTEM                                                               744     0           .0

 2/81  SYSTEM                                                               672     0           .0

 3/81  SYSTEM                                                               744     0           .0

       ** PROBLEMS/SOLUTIONS/COMMENTS

                        DURING THE FIRST QUARTER 1981 THE BOILER WAS OUT OF SERVICE DUE TO A MAJOR
                        OVERHAUL.  THE UNIT IS EXPECTED TO BE ON LINE IN LATE MAY OR EARLY JUNE.

 4/81  SYSTEM                                                               720     0           .0

 5/81  SYSTEM                                                               744     0           .0

 6/81  SYSTEM                                                               720     0           .0
```

TENNESSEE VALLEY AUTHORITY: WIDOWS CREEK 8 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

MAJOR OVERHAUL OF BOILER (BOILER TUBE REPAIRS) CONTINUED THROUGHOUT THE SECOND QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744	0		.0
8/81	SYSTEM							744	0		.0
9/81	SYSTEM							720	0		.0

** PROBLEMS/SOLUTIONS/COMMENTS

WIDOWS CREEK UNIT 8 REMAINED OFF LINE THROUGHOUT THE THIRD QUARTER 1981 AS THE BOILER OVERHAUL CONTINUED.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS POWER & LIGHT	
PLANT NAME	SANDOW	
UNIT NUMBER	4	
CITY	ROCKDALE	
STATE	TEXAS	
GROSS UNIT GENERATING CAPACITY - MW	545	
NET UNIT GENERATING CAPACITY W/FGD - MW	545	
EQUIVALENT SCRUBBED CAPACITY - MW	382	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	*******	(****** BTU/LB)
AVERAGE ASH CONTENT - %	13.00	
AVERAGE MOISTURE CONTENT - %	35.00	
AVERAGE SULFUR CONTENT - %	1.60	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIMESTONE	
SYSTEM SUPPLIER	COMBUSTION ENGINEERING	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.70	
SO2 DESIGN REMOVAL EFFICIENCY - %	75.00	
ENERGY CONSUMPTION - %	*******	
COMMERIAL START-UP DATE	1/81	
INITIAL START-UP DATE	12/80	
CONTRACT AWARDED	**/**	
*** SLUDGE		
** TREATMENT		
METHOD	FORCED OXIDATION	
** DISPOSAL		
TYPE	POND	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD PROBLEMS HAVE BEEN EXPERIENCED SINCE STARTUP. HOWEVER, APPRECIABLE AMOUNTS OF COAL WERE NOT FIRED UNTIL MARCH.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

TEXAS POWER & LIGHT: SANDOW 4 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE SECOND QUARTER 1981 THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

AS OF THE END OF SEPTEMBER, THE ONLY MAJOR OPERATIONAL PROBLEM REPORTED FOR THE SANDOW 4 FGD SYSTEM HAS BEEN EXCESSIVE MIST ELIMINATOR PLUGGING.

SANDOW 4 IS EXPECTED TO GO OFF-LINE IN MID-OCTOBER FOR AN OVERHAUL.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

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COMPANY NAME                                      TEXAS UTILITIES
PLANT NAME                                        MARTIN LAKE
UNIT NUMBER                                       1
CITY                                              TATUM
STATE                                             TEXAS
GROSS UNIT GENERATING CAPACITY - MW                 793
NET UNIT GENERATING CAPACITY W/FGD - MW             750
EQUIVALENT SCRUBBED CAPACITY - MW                   595

** FUEL DATA
    FUEL TYPE                                     COAL
    FUEL GRADE                                    LIGNITE
    AVERAGE HEAT CONTENT - J/G                     17166.       (  7380 BTU/LB)
    AVERAGE ASH CONTENT - %                           8.00
    AVERAGE MOISTURE CONTENT - %                     33.00
    AVERAGE SULFUR CONTENT - %                         .90
    AVERAGE CHLORIDE CONTENT - %                  ********

*** FGD SYSTEM

** GENERAL DATA
    PROCESS TYPE                                  LIMESTONE
    SYSTEM SUPPLIER                               RESEARCH-COTTRELL
    NEW/RETROFIT                                  NEW
    PARTICULATE DESIGN REMOVAL EFFICIENCY - %        99.40
    SO2 DESIGN REMOVAL EFFICIENCY - %                71.00
    ENERGY CONSUMPTION - %                            1.3
    COMMERIAL START-UP DATE                       10/78
    INITIAL START-UP DATE                          4/77
    CONTRACT AWARDED                              **/**

*** SLUDGE

** TREATMENT
    METHOD                                        STABILIZATION

** DISPOSAL
    TYPE                                          LANDFILL

** FGD SPARE CAPACITY INDICES
    ABSORBER - %                                       .0

** FGD SPARE COMPONENT INDICES
    ABSORBER                                           .0


-----------------------------------------PERFORMANCE DATA-----------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS  HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 1/81  SYSTEM                                                               744

 2/81  SYSTEM                                                               672

 3/81  SYSTEM                                                               744

      ** PROBLEMS/SOLUTIONS/COMMENTS

                         NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 1 FGD SYSTEM
                         DURING THE FIRST QUARTER OF 1981.  MAINTENANCE WORK IS CONTINUING
                         ON THE NEW ABSORBER MODULES.

 4/81  SYSTEM                                                               720

 5/81  SYSTEM                                                               744

 6/81  SYSTEM                                                               720
```

TEXAS UTILITIES: MARTIN LAKE 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 1 FGD SYSTEM DURING THE SECOND QUARTER 1981. UTILITY IS STILL IN PROCESS OF ADDING TWO ADDITIONAL ABSORBER MODULES (1 ADDITIONAL TRAIN) TO PRESENT FGD SYSTEM DUE TO EXCESSIVE SULFUR CONTENT OF PRESENT LIGNITE COAL SOURCE.

7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE THIRD QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. THE INSTALLATION IS EXPECTED TO BE COMPLETED BY THE SPRING OF 1982.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS UTILITIES
PLANT NAME	MARTIN LAKE
UNIT NUMBER	2
CITY	TATUM
STATE	TEXAS
GROSS UNIT GENERATING CAPACITY - MW	793
NET UNIT GENERATING CAPACITY W/FGD - MW	750
EQUIVALENT SCRUBBED CAPACITY - MW	595
** FUEL DATA	
FUEL TYPE	COAL
FUEL GRADE	LIGNITE
AVERAGE HEAT CONTENT - J/G	17166. (7380 BTU/LB)
AVERAGE ASH CONTENT - %	8.00
AVERAGE MOISTURE CONTENT - %	33.00
AVERAGE SULFUR CONTENT - %	.90
AVERAGE CHLORIDE CONTENT - %	********
*** FGD SYSTEM	
** GENERAL DATA	
PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	RESEARCH-COTTRELL
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.40
SO2 DESIGN REMOVAL EFFICIENCY - %	71.00
ENERGY CONSUMPTION - %	1.3
COMMERIAL START-UP DATE	**/**
INITIAL START-UP DATE	5/78
CONTRACT AWARDED	**/**
*** SLUDGE	
** TREATMENT	
METHOD	STABILIZATION
** DISPOSAL	
TYPE	LANDFILL
** FGD SPARE CAPACITY INDICES	
ABSORBER - %	.0
** FGD SPARE COMPONENT INDICES	
ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 2 FGD SYSTEM DURING THE FIRST QUARTER OF 1981. MAINTENANCE WORK IS CONTINUING ON THE NEW ABSORBER MODULES.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

TEXAS UTILITIES: MARTIN LAKE 2 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 2 FGD SYSTEM DURING THE SECOND QUARTER 1981. UTILITY IS STILL IN PROCESS OF ADDING TWO ADDITIONAL ABSORBER MODULES (1 ADDITIONAL TRAIN) TO PRESENT FGD SYSTEM DUE TO EXCESSIVE SULFUR CONTENT OF PRESENT LIGNITE COAL SOURCE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE THIRD QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. THE INSTALLATION IS EXPECTED TO BE COMPLETED BY THE SPRING OF 1983.

```
                                        SECTION 3
                 DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS
-------------------------------------------------------------------------------------------

COMPANY NAME                                  TEXAS UTILITIES
PLANT NAME                                    MARTIN LAKE
UNIT NUMBER                                   3
CITY                                          TATUM
STATE                                         TEXAS
GROSS UNIT GENERATING CAPACITY - MW             793
NET UNIT GENERATING CAPACITY W/FGD - MW         750
EQUIVALENT SCRUBBED CAPACITY - MW               595

** FUEL DATA
    FUEL TYPE                                 COAL
    FUEL GRADE                                LIGNITE
    AVERAGE HEAT CONTENT - J/G                 17166.        (  7380 BTU/LB)
    AVERAGE ASH CONTENT - %                       8.00
    AVERAGE MOISTURE CONTENT - %                 33.00
    AVERAGE SULFUR CONTENT - %                     .90
    AVERAGE CHLORIDE CONTENT - %              ********

*** FGD SYSTEM

** GENERAL DATA
    PROCESS TYPE                              LIMESTONE
    SYSTEM SUPPLIER                           RESEARCH-COTTRELL
    NEW/RETROFIT                              NEW
    PARTICULATE DESIGN REMOVAL EFFICIENCY - %    99.40
    SO2 DESIGN REMOVAL EFFICIENCY - %            71.00
    ENERGY CONSUMPTION - %                        1.3
    COMMERIAL START-UP DATE                   **/**
    INITIAL START-UP DATE                      2/79
    CONTRACT AWARDED                          **/**

*** SLUDGE

** TREATMENT
    METHOD                                    STABILIZATION

** DISPOSAL
    TYPE                                      LANDFILL

** FGD SPARE CAPACITY INDICES
    ABSORBER - %                                   .0

** FGD SPARE COMPONENT INDICES
    ABSORBER                                       .0


-------------------------------------------PERFORMANCE DATA------------------------------------------
PERIOD MODULE AVAILABILITY OPERABILITY RELIABILITY UTILIZATION  % REMOVAL   PER  BOILER  FGD   CAP.
                                                                SO2  PART. HOURS HOURS HOURS FACTOR
------ ------ ------------ ----------- ----------- ----------- ----- ----- ----- ------ ----- ------

 1/81  SYSTEM                                                               744

 2/81  SYSTEM                                                               672

 3/81  SYSTEM                                                               744

        ** PROBLEMS/SOLUTIONS/COMMENTS

                        NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 3 FGD SYSTEM
                        DURING THE FIRST QUARTER OF 1981.  MAINTENANCE WORK IS CONTINUING
                        ON THE NEW ABSORBER MODULES.

 4/81  SYSTEM                                                               720

 5/81  SYSTEM                                                               744

 6/81  SYSTEM                                                               720
```

TEXAS UTILITIES: MARTIN LAKE 3 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

NO OPERATIONAL PROBLEMS WERE REPORTED FOR THE MARTIN LAKE 3 FGD SYSTEM DURING THE SECOND QUARTER 1981. UTILITY IS STILL IN PROCESS OF ADDING TWO ADDITIONAL ABSORBER MODULES (1 ADDITIONAL TRAIN) TO PRESENT FGD SYSTEM DUE TO EXCESSIVE SULFUR CONTENT OF PRESENT LIGNITE COAL SOURCE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

WORK CONTINUED DURING THE THIRD QUARTER 1981 ON THE INSTALLATION OF THE ADDITIONAL ABSORBER TRAIN. THE INSTALLATION IS EXPECTED TO BE COMPLETED BY THE FALL OF 1982.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	TEXAS UTILITIES
PLANT NAME	MONTICELLO
UNIT NUMBER	3
CITY	MT. PLEASANT
STATE	TEXAS
GROSS UNIT GENERATING CAPACITY - MW	800
NET UNIT GENERATING CAPACITY W/FGD - MW	750
EQUIVALENT SCRUBBED CAPACITY - MW	800

** FUEL DATA

FUEL TYPE	COAL	
FUEL GRADE	LIGNITE	
AVERAGE HEAT CONTENT - J/G	*******	(****** BTU/LB)
AVERAGE ASH CONTENT - %	18.90	
AVERAGE MOISTURE CONTENT - %	31.90	
AVERAGE SULFUR CONTENT - %	1.50	
AVERAGE CHLORIDE CONTENT - %	.04	

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIMESTONE
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	74.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	10/78
INITIAL START-UP DATE	5/78
CONTRACT AWARDED	**/**

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM							744			
2/81	SYSTEM							672			
3/81	SYSTEM							744			

** PROBLEMS/SOLUTIONS/COMMENTS

MINOR PROBLEMS WITH THE RECYCLE PUMP WERE ENCOUNTERED THROUGHOUT THE FIRST QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM							720			
5/81	SYSTEM							744			
6/81	SYSTEM							720			

TEXAS UTILITIES: MONTICELLO 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR

** PROBLEMS/SOLUTIONS/COMMENTS

NO PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981. FGD SYSTEM PERFORMANCE WAS REPORTED AS BEING VERY GOOD.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

IT WAS REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED AT MONTICELLO 3 DURING THE THIRD QUARTER 1981.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UTAH POWER & LIGHT
PLANT NAME	HUNTER
UNIT NUMBER	1
CITY	CASTLE DALE
STATE	UTAH
GROSS UNIT GENERATING CAPACITY - MW	400
NET UNIT GENERATING CAPACITY W/FGD - MW	400
EQUIVALENT SCRUBBED CAPACITY - MW	360

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	29075. (12500 BTU/LB)
AVERAGE ASH CONTENT - %	10.00
AVERAGE MOISTURE CONTENT - %	6.50
AVERAGE SULFUR CONTENT - %	.55
AVERAGE CHLORIDE CONTENT - %	********

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	*******
COMMERIAL START-UP DATE	5/79
INITIAL START-UP DATE	5/79
CONTRACT AWARDED	4/76

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/80	SYSTEM		100.0		96.5			744	718	718	
11/80	SYSTEM		80.0		76.4			720	687	550	

** PROBLEMS/SOLUTIONS/COMMENTS

OUTAGE TIME DURING NOVEMBER WAS THE RESULT OF A THICKENER RAKE FAILURE. THE SYSTEM WAS OFF LINE APPROXIMATELY SIX DAYS.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
12/80	SYSTEM		96.6		96.2			744	741	715	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING DECEMBER 25 HOURS OF OUTAGE TIME WAS CAUSED BY A LIME SLAKER PROBLEM.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM		100.0		92.7			744	690	690	

UTAH POWER & LIGHT: HUNTER 1 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
2/81	SYSTEM		100.0		94.6			672	636	636	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING JANUARY AND FEBRUARY NO MAJOR PROBLEMS WERE ENCOUNTERED WITH THE FGD SYSTEM.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
3/81	SYSTEM		100.0		30.5			744	227	227	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING MARCH THE BOILER AND THE SYSTEM WERE OUT OF SERVICE FOR APPROXIMATELY 517 HOURS DUE TO A SCHEDULED OVERHAUL.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
4/81	SYSTEM		100.0		65.7			720	473	473	
5/81	SYSTEM		100.0		90.4			744	673	673	
6/81	SYSTEM		100.0		89.1			720	642	642	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL		PER	BOILER	FGD	CAP.
						SO2	PART.	HOURS	HOURS	HOURS	FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER 1981.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UTAH POWER & LIGHT	
PLANT NAME	HUNTER	
UNIT NUMBER	2	
CITY	CASTLE DALE	
STATE	UTAH	
GROSS UNIT GENERATING CAPACITY - MW	400	
NET UNIT GENERATING CAPACITY W/FGD - MW	400	
EQUIVALENT SCRUBBED CAPACITY - MW	360	
** FUEL DATA		
FUEL TYPE	COAL	
FUEL GRADE	******	
AVERAGE HEAT CONTENT - J/G	29075.	(12500 BTU/LB)
AVERAGE ASH CONTENT - %	10.00	
AVERAGE MOISTURE CONTENT - %	6.50	
AVERAGE SULFUR CONTENT - %	.55	
AVERAGE CHLORIDE CONTENT - %	********	
*** FGD SYSTEM		
** GENERAL DATA		
PROCESS TYPE	LIME	
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES	
NEW/RETROFIT	NEW	
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50	
SO2 DESIGN REMOVAL EFFICIENCY - %	80.00	
ENERGY CONSUMPTION - %	*******	
COMMERIAL START-UP DATE	6/80	
INITIAL START-UP DATE	6/80	
CONTRACT AWARDED	**/**	
*** SLUDGE		
** TREATMENT		
METHOD	STABILIZATION	
** DISPOSAL		
TYPE	LANDFILL	
** FGD SPARE CAPACITY INDICES		
ABSORBER - %	.0	
** FGD SPARE COMPONENT INDICES		
ABSORBER	.0	

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
10/80	SYSTEM		100.0		70.1			744	521	521	
11/80	SYSTEM		100.0		98.3			720	708	708	
12/80	SYSTEM		100.0		99.8			744	742	742	

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE FOURTH QUARTER 1980.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM		100.0		88.8			744	661	661	
2/81	SYSTEM		100.0		96.3			672	647	647	
3/81	SYSTEM		100.0		99.4			744	740	740	

UTAH POWER & LIGHT: HUNTER 2 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD RELATED PROBLEMS WERE ENCOUNTERED DURING THE FIRST QUARTER 1981.										
4/81	SYSTEM		100.0		99.6			720	717	717	
5/81	SYSTEM		100.0		62.9			744	468	468	
6/81	SYSTEM		100.0		90.8			720	653	653	
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981.										
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			
	** PROBLEMS/SOLUTIONS/COMMENTS										
	THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER 1981.										

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

COMPANY NAME	UTAH POWER & LIGHT
PLANT NAME	HUNTINGTON
UNIT NUMBER	1
CITY	PRICE
STATE	UTAH
GROSS UNIT GENERATING CAPACITY - MW	430
NET UNIT GENERATING CAPACITY W/FGD - MW	400
EQUIVALENT SCRUBBED CAPACITY - MW	366

** FUEL DATA

FUEL TYPE	COAL
FUEL GRADE	BITUMINOUS
AVERAGE HEAT CONTENT - J/G	29075. (12500 BTU/LB)
AVERAGE ASH CONTENT - %	10.00
AVERAGE MOISTURE CONTENT - %	6.50
AVERAGE SULFUR CONTENT - %	.55
AVERAGE CHLORIDE CONTENT - %	********

*** FGD SYSTEM

** GENERAL DATA

PROCESS TYPE	LIME
SYSTEM SUPPLIER	GE ENVIRONMENTAL SERVICES
NEW/RETROFIT	NEW
PARTICULATE DESIGN REMOVAL EFFICIENCY - %	99.50
SO2 DESIGN REMOVAL EFFICIENCY - %	80.00
ENERGY CONSUMPTION - %	1.6
COMMERIAL START-UP DATE	5/78
INITIAL START-UP DATE	5/78
CONTRACT AWARDED	1/75

*** SLUDGE

** TREATMENT

METHOD	STABILIZATION

** DISPOSAL

TYPE	LANDFILL

** FGD SPARE CAPACITY INDICES

ABSORBER - %	.0

** FGD SPARE COMPONENT INDICES

ABSORBER	.0

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
1/81	SYSTEM		100.0		96.4			744	717	717	
2/81	SYSTEM		100.0		100.0			672	672	672	
3/81	SYSTEM		100.0		93.5			744	696	696	

** PROBLEMS/SOLUTIONS/COMMENTS

DURING THE FIRST QUARTER 1981, THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE EXPERIENCED.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
4/81	SYSTEM		100.0		34.8			720	251	251	
5/81	SYSTEM		100.0		4.2			744	31	31	
6/81	SYSTEM		100.0		77.5			720	558	558	

UTAH POWER & LIGHT: HUNTINGTON 1 (CONT.)

PERFORMANCE DATA

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE SECOND QUARTER 1981. LOW BOILERS HOURS DURING THE MONTH OF MAY WERE DUE TO COAL STRIKE AND SCHEDULED UNIT OUTAGE.

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
7/81	SYSTEM							744			
8/81	SYSTEM							744			
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

THE UTILITY REPORTED THAT NO MAJOR FGD-RELATED PROBLEMS WERE ENCOUNTERED DURING THE THIRD QUARTER 1981.

SECTION 3
DESIGN AND PERFORMANCE DATA FOR OPERATIONAL DOMESTIC FGD SYSTEMS

```
COMPANY NAME                                     UTAH POWER & LIGHT
PLANT NAME                                       NAUGHTON
UNIT NUMBER                                      3
CITY                                             KEMMERER
STATE                                            WYOMING
REGULATORY CLASSIFICATION                        C
PARTICULATE EMISSION LIMITATION - NG/J           ******        (****** LB/MMBTU)
SO2 EMISSION LIMITATION - NG/J                      86.        (  .200 LB/MMBTU)
NOX EMISSION LIMITATION - NG/J                   ******        (****** LB/MMBTU)
NET PLANT GENERATING CAPACITY - MW               *****
GROSS UNIT GENERATING CAPACITY - MW                330
NET UNIT GENERATING CAPACITY W/FGD - MW            310
NET UNIT GENERATING CAPACITY WO/FGD - MW           315
EQUIVALENT SCRUBBED CAPACITY - MW                  330

 ** UNIT DATA - BOILER AND STACK
     BOILER SUPPLIER                             COMBUSTION ENGINEERING
     BOILER TYPE                                 PULVERIZED COAL
     BOILER SERVICE LOAD                         BASE
     DESIGN BOILER FLUE GAS FLOW - CU.M/S          707.85      (1500000 ACFM)
     BOILER FLUE GAS TEMPERATURE - C               148.9       ( 300 F)
     STACK HEIGHT - M                              145.        ( 475 FT)
     STACK SHELL                                 ******
     STACK TOP DIAMETER - M                      *******       (***** FT)

 ** FUEL DATA
     FUEL TYPE                                   COAL
     FUEL GRADE                                  SUBBITUMINOUS
     AVERAGE HEAT CONTENT - J/G                  22097.        (  9500 BTU/LB)
     RANGE HEAT CONTENT - BTU/LB                                ******
     AVERAGE ASH CONTENT - %                         6.00
     RANGE ASH CONTENT - %                       ******
     AVERAGE MOISTURE CONTENT - %                ********
     RANGE MOISTURE CONTENT - %                  ******
     AVERAGE SULFUR CONTENT - %                       .55
     RANGE SULFUR CONTENT - %                    ******
     AVERAGE CHLORIDE CONTENT - %                ********
     RANGE CHLORIDE CONTENT - %                  ******

*** PARTICLE CONTROL

 ** PARTICLE SCRUBBER
     GENERIC TYPE                                NONE
     SPECIFIC TYPE                               N/A
     TRADE NAME/COMMON NAME                      N/A
     GAS CONTACTING DEVICE TYPE                  N/A

*** FGD SYSTEM

 ** GENERAL DATA
     SALEABLE PRODUCT/THROWAWAY PRODUCT          THROWAWAY PRODUCT
     SO2 REMOVAL MODE                            WET SCRUBBING
     PROCESS TYPE                                SODIUM CARBONATE
     SYSTEM SUPPLIER                             AIR CORRECTION DIVISION, UOP
     A-E FIRM                                    BECHTEL
     DEVELOPMENT LEVEL                           FULL SCALE
     NEW/RETROFIT                                RETROFIT
     UNIT DESIGN PARTICLE REMOVAL EFFICIENCY - %   98.00
     UNIT DESIGN SO2 REMOVAL EFFICIENCY - %        70.00
     ENERGY CONSUMPTION - %                         1.5
     CURRENT STATUS                              1
     COMMERCIAL START-UP                         12/81
     INITIAL START-UP                             9/81

 ** DESIGN AND OPERATING PARAMETERS

 ** QUENCHER/PRESATURATOR
     CONSTRUCTION MATERIAL GENERIC TYPE          NR
     CONSTRUCTION MATERIAL SPECIFIC TYPE         NR
```

UTAH POWER & LIGHT: NAUGHTON 3 (CONT.)

** ABSORBER	
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
SHELL GENERIC MATERIAL	NR
SHELL SPECIFIC MATERIAL	NR
SHELL MATERIAL TRADE NAME/COMMON TYPE	NR
LINER GENERIC MATERIAL	NR
LINER SPECIFIC MATERIAL	NR
LINER MATERIAL TRADE NAME/COMMON TYPE	NR
** MIST ELIMINATOR	
PRE-MIST ELIMINATOR/MIST ELIMINATOR	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** REHEATER	
GENERIC TYPE	NR
SPECIFIC TYPE	NR
TRADE NAME/COMMON TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
** DAMPERS	
FUNCTION	NR
GENERIC TYPE	NR
SPECIFIC TYPE	NR
CONSTRUCTION MATERIAL GENERIC TYPE	NR
CONSTRUCTION MATERIAL SPECIFIC TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** DUCTWORK	
SHELL GENERIC MATERIAL TYPE	NR
SHELL SPECIFIC MATERIAL TYPE	NR
LINER GENERIC MATERIAL TYPE	NR
LINER SPECIFIC MATERIAL TYPE	NR
** REAGENT PREPARATION EQUIPMENT	
FUNCTION	MIX TANK
DEVICE	N/A
DEVICE TYPE	AGITATED TANK
** SOLIDS CONCENTRATING/DEWATERING	
DEVICE	NR
*** SLUDGE	
** TREATMENT	
METHOD	NR
DEVICE	NR
PROPRIETARY PROCESS	NR
** DISPOSAL	
NATURE	NR
TYPE	NR
SITE TREATMENT	NR

UTAH POWER & LIGHT: NAUGHTON 3 (CONT.)

PERFORMANCE DATA

PERIOD	MODULE	AVAILABILITY	OPERABILITY	RELIABILITY	UTILIZATION	% REMOVAL SO2	% REMOVAL PART.	PER HOURS	BOILER HOURS	FGD HOURS	CAP. FACTOR
9/81	SYSTEM							720			

** PROBLEMS/SOLUTIONS/COMMENTS

OPERATION OF THE FGD SYSTEM INSTALLED ON NAUGHTON 3 BEGAN IN SEPTEMBER 1981. THE SYSTEM IS CURRENTLY IN THE START-UP PHASE OF OPERATION AND IS NOT REQUIRED TO BE IN FULL SERVICE UNTIL THE END OF THE YEAR. SOME INITIAL DAMPER PROBLEMS WERE REPORTED.

SECTION 4
SUMMARY OF FGD SYSTEMS BY COMPANY

	TOTAL		STATUS							
			OPERATIONAL		CONSTRUCTION		CONTRACT AWARDED		PLANNED	
COMPANY NAME	NO.	MW	NO.	MW	NO.	MW	NO.	MW	NO.	MW
ALABAMA ELECTRIC	2	358.	2	358.	0	0.	0	0.	0	0.
ARIZONA ELECTRIC POWER	2	196.	2	196.	0	0.	0	0.	0	0.
ARIZONA PUBLIC SERVICE	8	2598.	6	1088.	2	1510.	0	0.	0	0.
ASSOCIATED ELECTRIC	1	670.	0	0.	1	670.	0	0.	0	0.
ATLANTIC CITY ELECTRIC	1	330.	0	0.	0	0.	0	0.	1	330.
BASIN ELECTRIC POWER	5	2590.	2	1140.	3	1450.	0	0.	0	0.
BIG RIVERS ELECTRIC	4	1364.	2	484.	1	440.	1	440.	0	0.
CAJUN ELECTRIC POWER	6	3328.	0	0.	0	0.	0	0.	6	3328.
CENTRAL ILLINOIS LIGHT	2	866.	1	416.	0	0.	0	0.	1	450.
CENTRAL ILLINOIS PUBLIC SERV	1	617.	1	617.	0	0.	0	0.	0	0.
CENTRAL MAINE POWER	1	600.	0	0.	0	0.	0	0.	1	600.
CENTRAL POWER & LIGHT	1	720.	0	0.	0	0.	0	0.	1	720.
CINCINNATI GAS & ELECTRIC	2	1300.	1	650.	0	0.	0	0.	1	650.
COLORADO UTE ELECTRIC	3	1267.	2	820.	1	447.	0	0.	0	0.
COLUMBUS & SOUTHERN OHIO ELEC	4	1572.	2	822.	0	0.	0	0.	2	750.
COMMONWEALTH EDISON	1	450.	1	450.	0	0.	0	0.	0	0.
COOPERATIVE POWER ASSOCIATION	2	654.	2	654.	0	0.	0	0.	0	0.
DELMARVA POWER & LIGHT	4	730.	3	180.	0	0.	0	0.	1	550.
DESERET GEN & TRANS	2	820.	0	0.	1	410.	0	0.	1	410.
DUQUESNE LIGHT	2	918.	2	918.	0	0.	0	0.	0	0.
EAST KENTUCKY POWER	2	1150.	0	0.	1	500.	0	0.	1	650.
FLORIDA POWER & LIGHT	2	1600.	0	0.	0	0.	0	0.	2	1600.
GENERAL PUBLIC UTILITIES	5	3190.	0	0.	0	0.	0	0.	5	3190.
GRAND HAVEN BRD OF LIGHT & PWR	1	65.	0	0.	1	65.	0	0.	0	0.
HOOSIER ENERGY	2	882.	0	0.	2	882.	0	0.	0	0.
HOUSTON LIGHTING & POWER	3	1992.	0	0.	1	492.	2	1500.	0	0.
INDIANAPOLIS POWER & LIGHT	5	3012.	1	532.	1	530.	0	0.	3	1950.
IOWA ELECTRIC LIGHT & PWR	1	720.	0	0.	0	0.	0	0.	1	720.
JACKSONVILLE ELEC AUTHORITY	2	1200.	0	0.	0	0.	0	0.	2	1200.
KANSAS CITY POWER & LIGHT	3	1000.	3	1000.	0	0.	0	0.	0	0.
KANSAS POWER & LIGHT	4	1575.	4	1575.	0	0.	0	0.	0	0.
KENTUCKY UTILITIES	3	1364.	1	64.	0	0.	0	0.	2	1300.
LAKELAND UTILITIES	1	364.	0	0.	1	364.	0	0.	0	0.
LANSING BOARD OF WATER & LIGHT	1	160.	0	0.	0	0.	0	0.	1	160.
LOS ANGELES DEPT OF WTR & PWR	4	3280.	0	0.	0	0.	0	0.	4	3280.
LOUISVILLE GAS & ELECTRIC	10	3539.	6	1544.	2	845.	0	0.	2	1150.
LOWER COLORADO RIVER AUTH	1	435.	0	0.	0	0.	0	0.	1	435.
MARQUETTE BOARD OF LIGHT & PWR	1	44.	0	0.	1	44.	0	0.	0	0.
MICHIGAN SO CENTRAL PWR AGENCY	1	55.	0	0.	1	55.	0	0.	0	0.
MIDDLE SOUTH UTILITIES	6	5340.	0	0.	0	0.	0	0.	6	5340.
MINNESOTA POWER & LIGHT	1	475.	1	475.	0	0.	0	0.	0	0.
MINNKOTA POWER	1	185.	1	185.	0	0.	0	0.	0	0.
MONONGAHELA POWER	2	1236.	2	1236.	0	0.	0	0.	0	0.
MONTANA POWER	4	2120.	2	720.	2	1400.	0	0.	0	0.
MONTANA-DAKOTA UTILITIES	1	440.	1	440.	0	0.	0	0.	0	0.
MUSCATINE POWER & WATER	1	166.	0	0.	1	166.	0	0.	0	0.
NEBRASKA PUBLIC POWER DISTRICT	1	650.	0	0.	0	0.	0	0.	1	650.
NEVADA POWER	8	2625.	3	375.	0	0.	0	0.	5	2250.
NEW YORK STATE ELEC & GAS	1	625.	0	0.	0	0.	0	0.	1	625.
NIAGARA MOHAWK POWER	1	100.	0	0.	1	100.	0	0.	0	0.
NORTHERN INDIANA PUB SERVICE	3	957.	1	115.	1	421.	1	421.	0	0.
NORTHERN STATES POWER	5	2600.	3	1590.	0	0.	0	0.	2	1010.
PACIFIC GAS & ELECTRIC	2	1600.	0	0.	0	0.	0	0.	2	1600.
PACIFIC POWER & LIGHT	5	2300.	1	550.	1	100.	0	0.	3	1650.
PENNSYLVANIA POWER	3	2751.	3	2751.	0	0.	0	0.	0	0.
PHILADELPHIA ELECTRIC	3	724.	0	0.	3	724.	0	0.	0	0.
PLAINS ELECTRIC G & T	1	233.	0	0.	1	233.	0	0.	0	0.
PLATTE RIVER POWER AUTHORITY	1	279.	0	0.	0	0.	1	279.	0	0.
PUBLIC SERVICE INDIANA	1	650.	0	0.	1	650.	0	0.	0	0.
PUBLIC SERVICE OF NEW MEXICO	4	1779.	3	1245.	1	534.	0	0.	0	0.

NOTE - PLANNED STATUS INCLUDES LETTER OF INTENT SIGNED, REQUESTING/EVALUATING BIDS, AND CONSIDERING ONLY FGD SYSTEMS

SECTION 4
SUMMARY OF FGD SYSTEMS BY COMPANY

COMPANY NAME	TOTAL		STATUS: OPERATIONAL		STATUS: CONSTRUCTION		STATUS: CONTRACT AWARDED		STATUS: PLANNED	
	NO.	MW	NO.	MW	NO.	MW	NO.	MW	NO.	MW
PWR AUTHORITY OF STATE OF NY	1	700.	0	0.	0	0.	0	0.	1	700.
SALT RIVER PROJECT	3	840.	2	560.	0	0.	0	0.	1	280.
SAN MIGUEL ELECTRIC	1	400.	1	400.	0	0.	0	0.	0	0.
SEMINOLE ELECTRIC	2	1240.	0	0.	1	620.	1	620.	0	0.
SIKESTON BRD OF MUNICIPAL UTIL	1	235.	1	235.	0	0.	0	0.	0	0.
SOUTH CAROLINA PUBLIC SERVICE	5	1700.	3	700.	1	500.	1	500.	0	0.
SOUTH MISSISSIPPI ELEC PWR	2	248.	2	248.	0	0.	0	0.	0	0.
SOUTHERN ILLINOIS POWER	1	173.	1	173.	0	0.	0	0.	0	0.
SOUTHERN INDIANA GAS & ELEC	2	530.	1	265.	0	0.	0	0.	1	265.
SOUTHWESTERN ELECTRIC POWER	3	2160.	0	0.	0	0.	2	1440.	1	720.
SOYLAND POWER	1	500.	0	0.	0	0.	0	0.	1	500.
SPRINGFIELD CITY UTILITIES	1	194.	1	194.	0	0.	0	0.	0	0.
SPRINGFIELD WATER, LIGHT & PWR	1	185.	1	185.	0	0.	0	0.	0	0.
ST. JOE ZINC	1	60.	1	60.	0	0.	0	0.	0	0.
SUNFLOWER ELECTRIC	1	347.	0	0.	1	347.	0	0.	0	0.
TAMPA ELECTRIC	1	475.	0	0.	0	0.	1	475.	0	0.
TENNESSEE VALLEY AUTHORITY	6	2553.	4	1145.	2	1408.	0	0.	0	0.
TEXAS MUNICIPAL POWER AGENCY	1	400.	0	0.	1	400.	0	0.	0	0.
TEXAS POWER & LIGHT	3	1882.	1	382.	0	0.	2	1500.	0	0.
TEXAS UTILITIES	8	5585.	4	2585.	0	0.	1	750.	3	2250.
TUCSON ELECTRIC POWER	2	740.	0	0.	0	0.	2	740.	0	0.
UNITED POWER ASSOCIATION	1	50.	0	0.	1	50.	0	0.	0	0.
UTAH POWER & LIGHT	6	2216.	4	1416.	2	800.	0	0.	0	0.
WASHINGTON WATER POWER	4	2280.	0	0.	0	0.	0	0.	4	2280.
WEST PENN POWER	1	300.	0	0.	1	300.	0	0.	0	0.
WEST TEXAS UTILITIES	2	1224.	0	0.	0	0.	1	504.	1	720.
TOTALS	222	102627.	92	31738.	42	17457.	16	9169.	72	44263.

NOTE - PLANNED STATUS INCLUDES LETTER OF INTENT SIGNED, REQUESTING/EVALUATING BIDS, AND CONSIDERING ONLY FGD SYSTEMS

SECTION 5
SUMMARY OF FGD SYSTEMS BY SYSTEM SUPPLIER

SYSTEM SUPPLIER/PROCESS	TOTAL		STATUS: OPERATIONAL		STATUS: CONSTRUCTION		STATUS: CONTRACT AWARDED	
	NO.	MW	NO.	MW	NO.	MW	NO.	MW
AIR CORRECTION DIVISION, UOP								
LIME	2	822.	2	822.	0	0.	0	0.
LIMESTONE	5	2616.	3	1176.	0	0.	2	1440.
LIME/LIMESTONE	1	10.	1	10.	0	0.	0	0.
SODIUM CARBONATE	2	880.	2	880.	0	0.	0	0.
TOTAL -	10	4328.	8	2888.	0	0.	2	1440.
AMERICAN AIR FILTER								
LIME	6	1658.	5	1163.	1	495.	0	0.
LIMESTONE	1	280.	1	280.	0	0.	0	0.
TOTAL -	7	1938.	6	1443.	1	495.	0	0.
BABCOCK & WILCOX								
LIME	4	1951.	3	1886.	1	65.	0	0.
LIMESTONE	8	2467.	6	2048.	2	419.	0	0.
LIME/SPRAY DRYING	2	1017.	0	0.	2	1017.	0	0.
TOTAL -	14	5435.	9	3934.	5	1501.	0	0.
COMBUSTION ENGINEERING								
LIME	5	802.	4	452.	1	350.	0	0.
LIMESTONE	12	5433.	7	2890.	3	1043.	2	1500.
LIMESTONE/ALKALINE FLYASH	2	1480.	2	1480.	0	0.	0	0.
LIME/ALKALINE FLYASH	2	654.	2	654.	0	0.	0	0.
TOTAL -	21	8369.	15	5476.	4	1393.	2	1500.
DAVY MCKEE								
WELLMAN LORD	8	2074.	7	1540.	1	534.	0	0.
TOTAL -	8	2074.	7	1540.	1	534.	0	0.
ENVIRONEERING, RILEY STOKER								
LIMESTONE	3	664.	3	664.	0	0.	0	0.
TOTAL -	3	664.	3	664.	0	0.	0	0.
FLAKT								
LIME/SODIUM CARBONATE	1	100.	0	0.	1	100.	0	0.
TOTAL	1	100.	0	0.	1	100.	0	0.
FMC								
DUAL ALKALI	3	1107.	1	265.	1	421.	1	421.
TOTAL	3	1107.	1	265.	1	421.	1	421.
GE ENVIRONMENTAL SERVICES								
DUAL ALKALI	1	617.	1	617.	0	0.	0	0.
LIME	8	4138.	7	3838.	1	300.	0	0.
LIMESTONE	8	5000.	1	800.	5	2700.	2	1500.
LIME/ALKALINE FLYASH	3	579.	3	579.	0	0.	0	0.
LIME/LIMESTONE	1	10.	1	10.	0	0.	0	0.
LIME/SPRAY DRYING	1	44.	0	0.	1	44.	0	0.
PROCESS NOT SELECTED	1	504.	0	0.	0	0.	1	504.
TOTAL -	23	10892.	13	5844.	7	3044.	3	2004.
JOY MFG/NIRO ATOMIZER								
LIME/SPRAY DRYING	7	2356.	1	110.	3	1227.	3	1019.
TOTAL -	7	2356.	1	110.	3	1227.	3	1019.
MITSUBISHI HEAVY INDUSTRIES								
LIMESTONE	2	882.	0	0.	2	882.	0	0.
TOTAL -	2	882.	0	0.	2	882.	0	0.

SECTION 5
SUMMARY OF FGD SYSTEMS BY SYSTEM SUPPLIER

			STATUS					
	TOTAL		OPERATIONAL		CONSTRUCTION		CONTRACT AWARDED	
SYSTEM SUPPLIER/PROCESS	NO.	MW	NO.	MW	NO.	MW	NO.	MW
MORRISON & KNUDSEN/U.S.B.M.								
CITRATE	1	60.	1	60.	0	0.	0	0.
TOTAL -	1	60.	1	60.	0	0.	0	0.
PEABODY PROCESS SYSTEMS								
LIMESTONE	8	3418.	4	1178.	2	1120.	2	1120.
LIME/ALKALINE FLY ASH	1	475.	1	475.	0	0.	0	0.
TOTAL -	9	3893.	5	1653.	2	1120.	2	1120.
PULLMAN KELLOGG								
LIME	1	917.	1	917.	0	0.	0	0.
LIMESTONE	6	2760.	2	560.	3	1760.	1	440.
TOTAL -	7	3677.	3	1477.	3	1760.	1	440.
RESEARCH-COTTRELL								
LIMESTONE	14	5261.	11	3815.	2	696.	1	750.
LIME/LIMESTONE	1	475.	0	0.	0	0.	1	475.
LIME/SPRAY DRYING	1	50.	0	0.	1	50.	0	0.
TOTAL -	16	5786.	11	3815.	3	746.	2	1225.
ROCKWELL INTERNATIONAL								
AQUEOUS CARBONATE/SPRAY DRYING	1	100.	0	0.	1	100.	0	0.
TOTAL -	1	100.	0	0.	1	100.	0	0.
TENNESSEE VALLEY AUTHORITY								
LIMESTONE	1	550.	1	550.	0	0.	0	0.
TOTAL -	1	550.	1	550.	0	0.	0	0.
THYSSEN/CEA								
DUAL ALKALI	1	299.	1	299.	0	0.	0	0.
LIME	1	500.	0	0.	1	500.	0	0.
LIME/ALKALINE FLYASH	5	2305.	3	905.	2	1400.	0	0.
SODIUM CARBONATE	3	375.	3	375.	0	0.	0	0.
TOTAL -	10	3479.	7	1579.	3	1900.	0	0.
UNITED ENGINEERS								
LIME	2	1510.	0	0.	2	1510.	0	0.
MAGNESIUM OXIDE	3	724.	0	0.	3	724.	0	0.
TOTAL -	5	2234.	0	0.	5	2234.	0	0.
WHEELABRATOR-FRYE/R.I.								
SODIUM CARBONATE/SPRAY DRYING	1	440.	1	440.	0	0.	0	0.
TOTAL -	1	440.	1	440.	0	0.	0	0.
TOTAL -	150	58364.	92	31738.	42	17457.	16	9169.

SECTION 6
SUMMARY OF FGD SYSTEMS BY PROCESS

	TOTAL		STATUS							
			OPERATIONAL		CONSTRUCTION		CONTRACT AWARDED		PLANNED	
PROCESS	NO.	MW	NO.	MW	NO.	MW	NO.	MW	NO.	MW
AQUEOUS CARBONATE/SPRAY DRYING	1	100.	0	0.	1	100.	0	0.	0	0.
CITRATE	1	60.	1	60.	0	0.	0	0.	0	0.
LIME	1	65.	0	0.	1	65.	0	0.	0	0.
LIMESTONE	1	166.	0	0.	1	166.	0	0.	0	0.
LIME/LIMESTONE	1	475.	0	0.	0	0.	1	475.	0	0.
MAGNESIUM OXIDE	3	724.	0	0.	3	724.	0	0.	0	0.
WELLMAN LORD	8	2074.	7	1540.	1	534.	0	0.	0	0.
SUBTOTAL - SALEABLE PRODUCT	16	3664.	8	1600.	7	1589.	1	475.	0	0.
DUAL ALKALI	5	2023.	3	1181.	1	421.	1	421.	0	0.
LIME	35	17173.	22	9078.	6	3155.	0	0.	7	4940.
LIMESTONE	79	36500.	39	13961.	18	8454.	10	6750.	12	7335.
LIMESTONE/ALKALINE FLYASH	2	1480.	2	1480.	0	0.	0	0.	0	0.
LIME/ALKALINE FLYASH	11	4013.	9	2613.	2	1400.	0	0.	0	0.
LIME/LIMESTONE	2	20.	2	20.	0	0.	0	0.	0	0.
LIME/SODIUM CARBONATE	1	100.	0	0.	1	100.	0	0.	0	0.
LIME/SPRAY DRYING	11	3467.	1	110.	7	2338.	3	1019.	0	0.
PROCESS NOT SELECTED	10	5315.	0	0.	0	0.	0	0.	10	5315.
SODIUM CARBONATE	9	3155.	5	1255.	0	0.	0	0.	4	1900.
SODIUM CARBONATE/SPRAY DRYING	1	440.	1	440.	0	0.	0	0.	0	0.
SUBTOTAL - THROWAWAY PRODUCT	166	73686.	84	30138.	35	15868.	14	8190.	33	19490.
TOTALS	182	77350.	92	31738.	42	17457.	15	8665.	33	19490.
SALEABLE PRODUCT PROCESS % OF TOTAL MW		5		5		9		5		0

NOTE: 40 UNITS ARE UNDECIDED AND ARE NOT INCLUDED IN THIS TABLE

SECTION 7
SUMMARY OF OPERATIONAL FGD SYSTEMS BY PROCESS AND UNIT

PROCESS/ UNIT NAME	UNIT NO.	CAPACITY MW	INITIAL STARTUP	COMMERCIAL STARTUP
CITRATE				
G.F. WEATON	1	60.	11/79	1/80
		60.		
DUAL ALKALI				
A.B. BROWN	1	265.	3/79	4/79
NEWTON	1	617.	9/79	12/79
CANE RUN	6	299.	4/79	0/ 0
		1181.		
LIME				
CONESVILLE	5	411.	1/77	2/77
CONESVILLE	6	411.	6/78	7/78
CANE RUN	4	188.	8/76	8/77
GREEN	1	242.	12/79	12/79
GREEN	2	242.	11/80	12/80
GREEN RIVER	1-3	64.	9/75	6/76
MILL CREEK	3	427.	8/78	3/79
EAST BEND	2	650.	3/81	3/81
PLEASANTS	1	618.	3/79	3/79
PLEASANTS	2	618.	10/80	12/80
CANE RUN	5	200.	12/77	7/78
HAWTHORN	3	90.	11/72	0/ 0
HAWTHORN	4	90.	8/72	0/ 0
PADDY'S RUN	6	72.	4/73	0/ 0
BRUCE MANSFIELD	1	917.	12/75	6/76
BRUCE MANSFIELD	2	917.	7/77	10/77
ELRAMA	1-4	510.	10/75	10/75
HUNTER	1	360.	5/79	5/79
HUNTER	2	360.	6/80	6/80
HUNTINGTON	1	366.	5/78	5/78
PHILLIPS	1-6	408.	7/73	6/74
BRUCE MANSFIELD	3	917.	6/80	6/80
		9078.		
LIMESTONE				
PETERSBURG	3	532.	12/77	12/77
POWERTON	51	450.	4/80	6/81
SOUTHWEST	1	194.	4/77	9/77
WINYAH	4	280.	7/81	0/ 0
LA CYGNE	1	820.	2/73	6/73
MARION	4	173.	5/79	6/79
SAN MIGUEL	1	400.	8/81	0/ 0
SIKESTON	1	235.	6/81	9/81
WINYAH	2	140.	7/77	0/ 0
WINYAH	3	280.	5/80	6/80
JEFFREY	1	540.	8/78	0/ 0
JEFFREY	2	490.	1/80	5/80
LAWRENCE	4	125.	1/77	0/ 0
LAWRENCE	5	420.	4/78	0/ 0
MILL CREEK	1	358.	12/80	4/81
SANJOW	4	382.	12/80	1/81
WIDOWS CREEK	7	575.	3/81	9/81
DUCK CREEK	1	416.	7/76	8/78
R.D MORROW, SR.	1	124.	8/78	8/78
R.D. MORROW, SR.	2	124.	6/79	6/79
MONTICELLO	3	800.	5/78	10/78
CRAIG	1	410.	10/80	0/ 0

THIS TABLE IDENTIFIES UNITS IN ALPHABETICAL ORDER.
RESPECTIVE COMPANIES CAN BE FOUND IN SECTION 1.

SECTION 7
SUMMARY OF OPERATIONAL FGD SYSTEMS BY PROCESS AND UNIT

PROCESS/ UNIT NAME	UNIT NO.	CAPACITY MW	INITIAL STARTUP	COMMERCIAL STARTUP
CRAIG	2	410.	12/79	5/80
TOMBIGBEE	2	179.	9/78	9/78
TOMBIGBEE	3	179.	6/79	6/79
CORONADO	1	280.	11/79	12/79
CORONADO	2	280.	7/80	10/81
APACHE	2	98.	8/78	1/79
APACHE	3	98.	6/79	4/79
CHOLLA	1	119.	10/73	12/73
CHOLLA	2	264.	4/78	6/78
CHOLLA	4	126.	3/81	6/81
DALLMAN	3	185.	12/80	0/81
LARAMIE RIVER	1	570.	7/80	7/80
LARAMIE RIVER	2	570.	7/81	6/81
MARTIN LAKE	1	595.	4/77	10/78
MARTIN LAKE	2	595.	5/78	0/ 0
MARTIN LAKE	3	595.	2/79	0/ 0
WIDOWS CREEK	8	550.	5/77	1/78
		13961.		
LIMESTONE/ALKALINE FLYASH				
SHERBURNE	1	740.	3/76	5/76
SHERBURNE	2	740.	3/77	4/77
		1480.		
LIME/ALKALINE FLYASH				
COAL CREEK	1	327.	7/79	8/79
COAL CREEK	2	327.	7/80	9/80
FOUR CORNERS	1	175.	11/79	0/ 0
FOUR CORNERS	2	175.	11/79	0/ 0
FOUR CORNERS	3	229.	11/79	0/ 0
CLAY BOSWELL	4	475.	4/80	0/ 0
COLSTRIP	1	360.	9/75	11/75
COLSTRIP	2	360.	5/76	10/76
MILTON R. YOUNG	2	185.	9/77	6/78
		2613.		
LIME/LIMESTONE				
SHAWNEE	10A	10.	4/72	0/ 0
SHAWNEE	10B	10.	4/72	0/ 0
		20.		
LIME/SPRAY DRYING				
RIVERSIDE	6-7	110.	11/80	12/80
		110.		
SODIUM CARBONATE				
JIM BRIDGER	4	550.	9/79	2/80
NAUGHTON	3	330.	9/81	12/81
REID GARDNER	1	125.	3/74	4/74
REID GARDNER	2	125.	4/74	0/ 0
REID GARDNER	3	125.	6/76	7/76
		1255.		
SODIUM CARBONATE/SPRAY DRYING				
COYOTE *	1	440.	4/81	5/81
		440.		

THIS TABLE IDENTIFIES UNITS IN ALPHABETICAL ORDER.
RESPECTIVE COMPANIES CAN BE FOUND IN SECTION 1.

SECTION 7
SUMMARY OF OPERATIONAL FGD SYSTEMS BY PROCESS AND UNIT

PROCESS/ UNIT NAME	UNIT NO.	CAPACITY MW	INITIAL STARTUP	COMMERCIAL STARTUP
WELLMAN LORD				
DEAN H. MITCHELL	11	115.	7/76	6/77
DELAWARE CITY	1	60.	5/80	5/80
DELAWARE CITY	2	60.	5/80	5/80
DELAWARE CITY	3	60.	5/80	5/80
SAN JUAN	1	361.	4/78	4/78
SAN JUAN	2	350.	8/78	8/78
SAN JUAN	3	534.	12/79	0/ 0
		1540.		
TOTAL		31738.		

SECTION 8
SUMMARY OF END-PRODUCT DISPOSAL PRACTICES FOR OPERATIONAL FGD SYSTEMS

PROCESS/ UNIT NAME	UNIT NO	THROWAWAY STABILIZED	THROWAWAY UNSTABILIZED	BYPRODUCT TYPE	BYPRODUCT DISPOSITION
CITRATE					
G.F. WEATON	1			ELEMENTAL SULFUR	
DUAL ALKALI					
A.B. BROWN	1	LANDFILL			
NEWTON	1	LANDFILL			
CANE RUN	6	LANDFILL			
LIME					
CONESVILLE	5	LANDFILL			
CONESVILLE	6	LANDFILL			
CANE RUN	4	LANDFILL			
GREEN	1	LANDFILL			
GREEN	2	LANDFILL			
GREEN RIVER	1-3	POND			
MILL CREEK	3	POND		NONE	
EAST BEND	2	LANDFILL			
PLEASANTS	1	POND		NONE	
PLEASANTS	2	POND		NONE	
CANE RUN	5	LANDFILL			
HAWTHORN	3	POND			
HAWTHORN	4	POND			
PADDY'S RUN	6	POND			
BRUCE MANSFIELD	1	POND			
BRUCE MANSFIELD	2	POND			
ELRAMA	1-4	LANDFILL			
HUNTER	1	LANDFILL			
HUNTER	2	LANDFILL			
HUNTINGTON	1	LANDFILL			
PHILLIPS	1-6	LANDFILL			
BRUCE MANSFIELD	3	LANDFILL			
LIMESTONE					
PETERSBURG	3	LANDFILL			
POWERTON	51	POND			
SOUTHWEST	1	LANDFILL			
WINYAH	4				
LA CYGNE	1	POND			
MARION	4	LANDFILL			
SAN MIGUEL	1	LANDFILL			
SIKESTON	1	POND			
WINYAH	2	POND			
WINYAH	3	POND			
JEFFREY	1	POND			
JEFFREY	2	POND			
LAWRENCE	4	POND			
LAWRENCE	5	POND			
MILL CREEK	1	LANDFILL		NONE	
SANDOW	4	POND			
WIDOWS CREEK	7	POND			
DUCK CREEK	1	POND			
R.D. MORROW, SR.	1	LANDFILL			
R.D. MORROW, SR.	2	LANDFILL			
MONTICELLO	3	LANDFILL			
CRAIG	1	POND			
CRAIG	2	POND			
TOMBIGBEE	2	POND			
TOMBIGBEE	3	POND			
CORONADO	1	POND			
CORONADO	2	POND			
APACHE	2	POND			
APACHE	3	POND			

SECTION 8

SUMMARY OF END-PRODUCT DISPOSAL PRACTICES FOR OPERATIONAL FGD SYSTEMS

PROCESS/ UNIT NAME	UNIT NO	THROWAWAY		BYPRODUCT	
		STABILIZED	UNSTABILIZED	TYPE	DISPOSITION
CHOLLA	1	POND			
CHOLLA	2	POND			
CHOLLA	4	POND			
DALLMAN	3	LANDFILL		NONE	
LARAMIE RIVER	1	LANDFILL			
LARAMIE RIVER	2	LANDFILL			LANDFILL
MARTIN LAKE	1	LANDFILL			
MARTIN LAKE	2	LANDFILL			
MARTIN LAKE	3	LANDFILL			
WIDOWS CREEK	8	POND			
LIMESTONE/ALK/LIME FLYASH					
SHERBURNE	1	POND			
SHERBURNE	2	POND			
LIME/ALKALINE FLYASH					
COAL CREEK	1	POND			
COAL CREEK	2	POND			
FOUR CORNERS	1				
FOUR CORNERS	2				
FOUR CORNERS	3				
CLAY BOSWELL	4	POND			
COLSTRIP	1	POND			
COLSTRIP	2	POND			
MILTON R. YOUNG	2	LANDFILL			
LIME/LIMESTONE					
SHAWNEE	10A	LANDFILL			
SHAWNEE	10B	LANDFILL			
LIME/SPRAY DRYING					
RIVERSIDE	6-7	LANDFILL			
SODIUM CARBONATE					
JIM BRIDGER	4	POND			
NAUGHTON	3				
REID GARDNER	1	POND			
REID GARDNER	2	POND			
REID GARDNER	3	POND			
SODIUM CARBONATE/SPRAY DRYING					
COYOTE	1	LANDFILL			
WELLMAN LORD					
DEAN H. MITCHELL	11			ELEMENTAL SULFUR	
DELAWARE CITY	1	POND		SULFURIC ACID	MARKETED
DELAWARE CITY	2	POND		SULFURIC ACID	MARKETED
DELAWARE CITY	3	POND		SULFURIC ACID	MARKETED
SAN JUAN	1			ELEMENTAL SULFUR	MARKETED
SAN JUAN	2			ELEMENTAL SULFUR	MARKETED
SAN JUAN	3			SULFURIC ACID	MARKETED

SECTION 9
SUMMARY OF FGD SYSTEMS IN OPERATION

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
ALABAMA ELECTRIC TOMBIGBEE	2	NEW	179.	LIMESTONE PEABODY PROCESS SYSTEMS	9/78
ALABAMA ELECTRIC TOMBIGBEE	3	NEW	179.	LIMESTONE PEABODY PROCESS SYSTEMS	6/79
ARIZONA ELECTRIC POWER APACHE	2	NEW	98.	LIMESTONE RESEARCH-COTTRELL	8/78
ARIZONA ELECTRIC POWER APACHE	3	NEW	98.	LIMESTONE RESEARCH-COTTRELL	6/79
ARIZONA PUBLIC SERVICE CHOLLA	1	RETROFIT	119.	LIMESTONE RESEARCH-COTTRELL	10/73
ARIZONA PUBLIC SERVICE CHOLLA	2	NEW	264.	LIMESTONE RESEARCH-COTTRELL	4/78
ARIZONA PUBLIC SERVICE CHOLLA	4	NEW	126.	LIMESTONE RESEARCH-COTTRELL	3/81
ARIZONA PUBLIC SERVICE FOUR CORNERS	1	RETROFIT	175.	LIME/ALKALINE FLYASH GE ENVIRONMENTAL SERVICES	11/79
ARIZONA PUBLIC SERVICE FOUR CORNERS	2	RETROFIT	175.	LIME/ALKALINE FLYASH GE ENVIRONMENTAL SERVICES	11/79
ARIZONA PUBLIC SERVICE FOUR CORNERS	3	RETROFIT	229.	LIME/ALKALINE FLYASH GE ENVIRONMENTAL SERVICES	11/79
BASIN ELECTRIC POWER LARAMIE RIVER	1	NEW	570.	LIMESTONE RESEARCH-COTTRELL	7/80
BASIN ELECTRIC POWER LARAMIE RIVER	2	NEW	570.	LIMESTONE RESEARCH-COTTRELL	7/81
BIG RIVERS ELECTRIC GREEN	1	NEW	242.	LIME AMERICAN AIR FILTER	12/79
BIG RIVERS ELECTRIC GREEN	2	NEW	242.	LIME AMERICAN AIR FILTER	11/80
CENTRAL ILLINOIS LIGHT DUCK CREEK	1	NEW	416.	LIMESTONE ENVIRONEERING, RILEY STOKER	7/76
CENTRAL ILLINOIS PUBLIC SERV NEWTON	1	NEW	617.	DUAL ALKALI GE ENVIRONMENTAL SERVICES	9/79
CINCINNATI GAS & ELECTRIC EAST BEND	2	NEW	650.	LIME BABCOCK & WILCOX	3/81
COLORADO UTE ELECTRIC CRAIG	1	NEW	410.	LIMESTONE PEABODY PROCESS SYSTEMS	10/80
COLORADO UTE ELECTRIC CRAIG	2	NEW	410.	LIMESTONE PEABODY PROCESS SYSTEMS	12/79
COLUMBUS & SOUTHERN OHIO ELEC CONESVILLE	5	NEW	411.	LIME AIR CORRECTION DIVISION, UOP	1/77
COLUMBUS & SOUTHERN OHIO ELEC CONESVILLE	6	NEW	411.	LIME AIR CORRECTION DIVISION, UOP	6/78
COMMONWEALTH EDISON POWERTON	51	RETROFIT	450.	LIMESTONE AIR CORRECTION DIVISION, UOP	4/80
COOPERATIVE POWER ASSOCIATION COAL CREEK	1	NEW	327.	LIME/ALKALINE FLYASH COMBUSTION ENGINEERING	7/79

SECTION 9
SUMMARY OF FGD SYSTEMS IN OPERATION

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
COOPERATIVE POWER ASSOCIATION COAL CREEK	2	NEW	327.	LIME/ALKALINE FLYASH COMBUSTION ENGINEERING	7/80
DELMARVA POWER & LIGHT DELAWARE CITY	1	RETROFIT	60.	WELLMAN LORD DAVY MCKEE	5/80
DELMARVA POWER & LIGHT DELAWARE CITY	2	RETROFIT	60.	WELLMAN LORD DAVY MCKEE	5/80
DELMARVA POWER & LIGHT DELAWARE CITY	3	RETROFIT	60.	WELLMAN LORD DAVY MCKEE	5/80
DUQUESNE LIGHT ELRAMA	1-4	RETROFIT	510.	LIME GE ENVIRONMENTAL SERVICES	10/75
DUQUESNE LIGHT PHILLIPS	1-6	RETROFIT	408.	LIME GE ENVIRONMENTAL SERVICES	7/73
INDIANAPOLIS POWER & LIGHT PETERSBURG	3	NEW	532.	LIMESTONE AIR CORRECTION DIVISION, UOP	12/77
KANSAS CITY POWER & LIGHT HAWTHORN	3	RETROFIT	90.	LIME COMBUSTION ENGINEERING	11/72
KANSAS CITY POWER & LIGHT HAWTHORN	4	RETROFIT	90.	LIME COMBUSTION ENGINEERING	8/72
KANSAS CITY POWER & LIGHT LA CYGNE	1	NEW	820.	LIMESTONE BABCOCK & WILCOX	2/73
KANSAS POWER & LIGHT JEFFREY	1	NEW	540.	LIMESTONE COMBUSTION ENGINEERING	8/78
KANSAS POWER & LIGHT JEFFREY	2	NEW	490.	LIMESTONE COMBUSTION ENGINEERING	1/80
KANSAS POWER & LIGHT LAWRENCE	4	RETROFIT	125.	LIMESTONE COMBUSTION ENGINEERING	1/77
KANSAS POWER & LIGHT LAWRENCE	5	RETROFIT	420.	LIMESTONE COMBUSTION ENGINEERING	4/78
KENTUCKY UTILITIES GREEN RIVER	1-3	RETROFIT	64.	LIME AMERICAN AIR FILTER	9/75
LOUISVILLE GAS & ELECTRIC CANE RUN	4	RETROFIT	188.	LIME AMERICAN AIR FILTER	8/76
LOUISVILLE GAS & ELECTRIC CANE RUN	5	RETROFIT	200.	LIME COMBUSTION ENGINEERING	12/77
LOUISVILLE GAS & ELECTRIC CANE RUN	6	RETROFIT	299.	DUAL ALKALI THYSSEN/CEA	4/79
LOUISVILLE GAS & ELECTRIC MILL CREEK	1	RETROFIT	358.	LIMESTONE COMBUSTION ENGINEERING	12/80
LOUISVILLE GAS & ELECTRIC MILL CREEK	3	NEW	427.	LIME AMERICAN AIR FILTER	8/78
LOUISVILLE GAS & ELECTRIC PADDY'S RUN	6	RETROFIT	72.	LIME COMBUSTION ENGINEERING	4/73
MINNESOTA POWER & LIGHT CLAY BOSWELL	4	NEW	475.	LIME/ALKALINE FLYASH PEABODY PROCESS SYSTEMS	4/80
MINNKOTA POWER MILTON R. YOUNG	2	NEW	185.	LIME/ALKALINE FLYASH THYSSEN/CEA	9/77

SECTION 9
SUMMARY OF FGD SYSTEMS IN OPERATION

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
MONONGAHELA POWER PLEASANTS	1	NEW	618.	LIME BABCOCK & WILCOX	3/79
MONONGAHELA POWER PLEASANTS	2	NEW	618.	LIME BABCOCK & WILCOX	10/80
MONTANA POWER COLSTRIP	1	NEW	360.	LIME/ALKALINE FLYASH THYSSEN/CEA	9/75
MONTANA POWER COLSTRIP	2	NEW	360.	LIME/ALKALINE FLYASH THYSSEN/CEA	5/76
MONTANA-DAKOTA UTILITIES COYOTE	1	NEW	440.	SODIUM CARBONATE/SPRAY DRYING WHEELABRATOR-FRYE/R.I.	4/81
NEVADA POWER REID GARDNER	1	RETROFIT	125.	SODIUM CARBONATE THYSSEN/CEA	3/74
NEVADA POWER REID GARDNER	2	RETROFIT	125.	SODIUM CARBONATE THYSSEN/CEA	4/74
NEVADA POWER REID GARDNER	3	NEW	125.	SODIUM CARBONATE THYSSEN/CEA	6/76
NORTHERN INDIANA PUB SERVICE DEAN H. MITCHELL	11	RETROFIT	115.	WELLMAN LORD DAVY MCKEE	7/76
NORTHERN STATES POWER RIVERSIDE	6-7	RETROFIT	110.	LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER	11/80
NORTHERN STATES POWER SHERBURNE	1	NEW	740.	LIMESTONE/ALKALINE FLYASH COMBUSTION ENGINEERING	3/76
NORTHERN STATES POWER SHERBURNE	2	NEW	740.	LIMESTONE/ALKALINE FLYASH COMBUSTION ENGINEERING	3/77
PACIFIC POWER & LIGHT JIM BRIDGER	4	NEW	550.	SODIUM CARBONATE AIR CORRECTION DIVISION, UOP	9/79
PENNSYLVANIA POWER BRUCE MANSFIELD	1	NEW	917.	LIME GE ENVIRONMENTAL SERVICES	12/75
PENNSYLVANIA POWER BRUCE MANSFIELD	2	NEW	917.	LIME GE ENVIRONMENTAL SERVICES	7/77
PENNSYLVANIA POWER BRUCE MANSFIELD	3	NEW	917.	LIME PULLMAN KELLOGG	6/80
PUBLIC SERVICE OF NEW MEXICO SAN JUAN	1	RETROFIT	361.	WELLMAN LORD DAVY MCKEE	4/78
PUBLIC SERVICE OF NEW MEXICO SAN JUAN	2	RETROFIT	350.	WELLMAN LORD DAVY MCKEE	8/78
PUBLIC SERVICE OF NEW MEXICO SAN JUAN	3	NEW	534.	WELLMAN LORD DAVY MCKEE	12/79
SALT RIVER PROJECT CORONADO	1	NEW	280.	LIMESTONE PULLMAN KELLOGG	11/79
SALT RIVER PROJECT CORONADO	2	NEW	280.	LIMESTONE PULLMAN KELLOGG	7/80
SAN MIGUEL ELECTRIC SAN MIGUEL	1	NEW	400.	LIMESTONE BABCOCK & WILCOX	8/81
SIKESTON BRD OF MUNICIPAL UTIL SIKESTON	1	NEW	235.	LIMESTONE BABCOCK & WILCOX	6/81

SECTION 9
SUMMARY OF FGD SYSTEMS IN OPERATION

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
SOUTH CAROLINA PUBLIC SERVICE WINYAH	2	NEW	140.	LIMESTONE BABCOCK & WILCOX	7/77
SOUTH CAROLINA PUBLIC SERVICE WINYAH	3	NEW	280.	LIMESTONE BABCOCK & WILCOX	5/80
SOUTH CAROLINA PUBLIC SERVICE WINYAH	4	NEW	280.	LIMESTONE AMERICAN AIR FILTER	7/81
SOUTH MISSISSIPPI ELEC PWR R.D. MORROW, SR.	1	NEW	124.	LIMESTONE ENVIRONEERING, RILEY STOKER	8/78
SOUTH MISSISSIPPI ELEC PWR R.D. MORROW, SR.	2	NEW	124.	LIMESTONE ENVIRONEERING, RILEY STOKER	6/79
SOUTHERN ILLINOIS POWER MARION	4	NEW	173.	LIMESTONE BABCOCK & WILCOX	5/79
SOUTHERN INDIANA GAS & ELEC A.B. BROWN	1	NEW	265.	DUAL ALKALI FMC	3/79
SPRINGFIELD CITY UTILITIES SOUTHWEST	1	NEW	194.	LIMESTONE AIR CORRECTION DIVISION, UOP	4/77
SPRINGFIELD WATER, LIGHT & PWR DALLMAN	3	NEW	185.	LIMESTONE RESEARCH-COTTRELL	12/80
ST. JOE ZINC G.F. WEATON	1	RETROFIT	60.	CITRATE MORRISON & KNUDSEN/U.S.B.M.	11/79
TENNESSEE VALLEY AUTHORITY SHAWNEE	10A	RETROFIT	10.	LIME/LIMESTONE AIR CORRECTION DIVISION, UOP	4/72
TENNESSEE VALLEY AUTHORITY SHAWNEE	10B	RETROFIT	10.	LIME/LIMESTONE GE ENVIRONMENTAL SERVICES	4/72
TENNESSEE VALLEY AUTHORITY WIDOWS CREEK	7	RETROFIT	575.	LIMESTONE COMBUSTION ENGINEERING	3/81
TENNESSEE VALLEY AUTHORITY WIDOWS CREEK	8	RETROFIT	550.	LIMESTONE TENNESSEE VALLEY AUTHORITY	5/77
TEXAS POWER & LIGHT SANDOW	4	NEW	382.	LIMESTONE COMBUSTION ENGINEERING	12/80
TEXAS UTILITIES MARTIN LAKE	1	NEW	595.	LIMESTONE RESEARCH-COTTRELL	4/77
TEXAS UTILITIES MARTIN LAKE	2	NEW	595.	LIMESTONE RESEARCH-COTTRELL	5/78
TEXAS UTILITIES MARTIN LAKE	3	NEW	595.	LIMESTONE RESEARCH-COTTRELL	2/79
TEXAS UTILITIES MONTICELLO	3	NEW	800.	LIMESTONE GE ENVIRONMENTAL SERVICES	5/78
UTAH POWER & LIGHT HUNTER	1	NEW	360.	LIME GE ENVIRONMENTAL SERVICES	5/79
UTAH POWER & LIGHT HUNTER	2	NEW	360.	LIME GE ENVIRONMENTAL SERVICES	6/80
UTAH POWER & LIGHT HUNTINGTON	1	NEW	366.	LIME GE ENVIRONMENTAL SERVICES	5/78
UTAH POWER & LIGHT NAUGHTON	3	RETROFIT	330.	SODIUM CARBONATE AIR CORRECTION DIVISION, UOP	9/81
TOTAL			31738.		

SECTION 10
SUMMARY OF FGD SYSTEMS UNDER CONSTRUCTION

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
ARIZONA PUBLIC SERVICE FOUR CORNERS	4	RETROFIT	755.	LIME UNITED ENGINEERS	12/84
ARIZONA PUBLIC SERVICE FOUR CORNERS	5	RETROFIT	755.	LIME UNITED ENGINEERS	12/84
ASSOCIATED ELECTRIC THOMAS HILL	3	NEW	670.	LIMESTONE PULLMAN KELLOGG	1/82
BASIN ELECTRIC POWER ANTELOPE VALLEY	1	NEW	440.	LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER	10/83
BASIN ELECTRIC POWER ANTELOPE VALLEY	2	NEW	440.	LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER	10/85
BASIN ELECTRIC POWER LARAMIE RIVER	3	NEW	570.	LIME/SPRAY DRYING BABCOCK & WILCOX	11/82
BIG RIVERS ELECTRIC D.B. WILSON	1	NEW	440.	LIMESTONE PULLMAN KELLOGG	7/84
COLORADO UTE ELECTRIC CRAIG	3	NEW	447.	LIME/SPRAY DRYING BABCOCK & WILCOX	4/83
DESERET GEN & TRANS BONANZA	1	NEW	410.	LIMESTONE COMBUSTION ENGINEERING	9/84
EAST KENTUCKY POWER SPURLOCK	2	NEW	500.	LIME THYSSEN/CEA	4/83
GRAND HAVEN BRD OF LIGHT & PWR J.B. SIMS	3	NEW	65.	LIME BABCOCK & WILCOX	1/83
HOOSIER ENERGY MEROM	1	NEW	441.	LIMESTONE MITSUBISHI HEAVY INDUSTRIES	5/82
HOOSIER ENERGY MEROM	2	NEW	441.	LIMESTONE MITSUBISHI HEAVY INDUSTRIES	11/81
HOUSTON LIGHTING & POWER W.A. PARISH	8	NEW	492.	LIMESTONE GE ENVIRONMENTAL SERVICES	11/82
INDIANAPOLIS POWER & LIGHT PETERSBURG	4	NEW	530.	LIMESTONE RESEARCH-COTTRELL	10/84
LAKELAND UTILITIES MCINTOSH	3	NEW	364.	LIMESTONE BABCOCK & WILCOX	1/82
LOUISVILLE GAS & ELECTRIC MILL CREEK	2	RETROFIT	350.	LIME COMBUSTION ENGINEERING	12/81
LOUISVILLE GAS & ELECTRIC MILL CREEK	4	NEW	495.	LIME AMERICAN AIR FILTER	6/82
MARQUETTE BOARD OF LIGHT & PWR SHIRAS	3	NEW	44.	LIME/SPRAY DRYING GE ENVIRONMENTAL SERVICES	9/82
MICHIGAN SO CENTRAL PWR AGENCY PROJECT	1	NEW	55.	LIMESTONE BABCOCK & WILCOX	6/82
MONTANA POWER COLSTRIP	3	NEW	700.	LIME/ALKALINE FLYASH THYSSEN/CEA	10/83
MONTANA POWER COLSTRIP	4	NEW	700.	LIME/ALKALINE FLYASH THYSSEN/CEA	0/84
MUSCATINE POWER & WATER MUSCATINE	9	NEW	166.	LIMESTONE RESEARCH-COTTRELL	9/82

SECTION 10
SUMMARY OF FGD SYSTEMS UNDER CONSTRUCTION

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
NIAGARA MOHAWK POWER CHARLES R. HUNTLEY	66	RETROFIT	100.	AQUEOUS CARBONATE/SPRAY DRYING ROCKWELL INTERNATIONAL	4/82
NORTHERN INDIANA PUB SERVICE SCHAHFER	17	NEW	421.	DUAL ALKALI FMC	6/83
PACIFIC POWER & LIGHT JIM BRIDGER	2A	RETROFIT	100.	LIME/SODIUM CARBONATE FLAKT	1/82
PHILADELPHIA ELECTRIC CROMBY	1	RETROFIT	150.	MAGNESIUM OXIDE UNITED ENGINEERS	5/83
PHILADELPHIA ELECTRIC EDDYSTONE	1	RETROFIT	240.	MAGNESIUM OXIDE UNITED ENGINEERS	12/82
PHILADELPHIA ELECTRIC EDDYSTONE	2	RETROFIT	334.	MAGNESIUM OXIDE UNITED ENGINEERS	12/82
PLAINS ELECTRIC G & T PLAINS ESCALANTE	1	NEW	233.	LIMESTONE COMBUSTION ENGINEERING	12/83
PUBLIC SERVICE INDIANA GIBSON	5	NEW	650.	LIMESTONE PULLMAN KELLOGG	8/82
PUBLIC SERVICE OF NEW MEXICO SAN JUAN	4	NEW	534.	WELLMAN LORD DAVY MCKEE	6/82
SEMINOLE ELECTRIC SEMINOLE	1	NEW	620.	LIMESTONE PEABODY PROCESS SYSTEMS	3/83
SOUTH CAROLINA PUBLIC SERVICE CROSS	2	NEW	500.	LIMESTONE PEABODY PROCESS SYSTEMS	11/83
SUNFLOWER ELECTRIC HOLCOMB	1	NEW	347.	LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER	9/83
TENNESSEE VALLEY AUTHORITY PARADISE	1	RETROFIT	704.	LIMESTONE GE ENVIRONMENTAL SERVICES	3/82
TENNESSEE VALLEY AUTHORITY PARADISE	2	RETROFIT	704.	LIMESTONE GE ENVIRONMENTAL SERVICES	6/82
TEXAS MUNICIPAL POWER AGENCY GIBBONS CREEK	1	NEW	400.	LIMESTONE COMBUSTION ENGINEERING	10/82
UNITED POWER ASSOCIATION STANTON	1A	NEW	50.	LIME/SPRAY DRYING RESEARCH-COTTRELL	6/82
UTAH POWER & LIGHT HUNTER	3	NEW	400.	LIMESTONE GE ENVIRONMENTAL SERVICES	6/83
UTAH POWER & LIGHT HUNTER	4	NEW	400.	LIMESTONE GE ENVIRONMENTAL SERVICES	6/85
WEST PENN POWER MITCHELL	33	RETROFIT	300.	LIME GE ENVIRONMENTAL SERVICES	8/82
TOTAL			17457.		

SECTION 11
SUMMARY OF CONTRACT AWARDED FGD SYSTEMS

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
BIG RIVERS ELECTRIC D.B. WILSON	2	NEW	440.	LIMESTONE PULLMAN KELLOGG	0/86
HOUSTON LIGHTING & POWER LIMESTONE	1	NEW	750.	LIMESTONE COMBUSTION ENGINEERING	12/86
HOUSTON LIGHTING & POWER LIMESTONE	2	NEW	750.	LIMESTONE COMBUSTION ENGINEERING	12/87
NORTHERN INDIANA PUB SERVICE SCHAHFER	18	NEW	421.	DUAL ALKALI FMC	6/85
PLATTE RIVER POWER AUTHORITY RAWHIDE	1	NEW	279.	LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER	12/83
SEMINOLE ELECTRIC SEMINOLE	2	NEW	620.	LIMESTONE PEABODY PROCESS SYSTEMS	1/85
SOUTH CAROLINA PUBLIC SERVICE CROSS	1	NEW	500.	LIMESTONE PEABODY PROCESS SYSTEMS	5/88
SOUTHWESTERN ELECTRIC POWER DOLET HILLS	1	NEW	720.	LIMESTONE AIR CORRECTION DIVISION, UOP	3/86
SOUTHWESTERN ELECTRIC POWER HENRY W. PIRKEY	1	NEW	720.	LIMESTONE AIR CORRECTION DIVISION, UOP	12/84
TAMPA ELECTRIC BIG BEND	4	NEW	475.	LIME/LIMESTONE RESEARCH-COTTRELL	3/85
TEXAS POWER & LIGHT TWIN OAKS	1	NEW	750.	LIMESTONE GE ENVIRONMENTAL SERVICES	8/85
TEXAS POWER & LIGHT TWIN OAKS	2	NEW	750.	LIMESTONE GE ENVIRONMENTAL SERVICES	8/87
TEXAS UTILITIES MARTIN LAKE	4	NEW	750.	LIMESTONE RESEARCH-COTTRELL	0/89
TUCSON ELECTRIC POWER SPRINGERVILLE	1	NEW	370.	LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER	2/85
TUCSON ELECTRIC POWER SPRINGERVILLE	2	NEW	370.	LIME/SPRAY DRYING JOY MFG/NIRO ATOMIZER	3/87
WEST TEXAS UTILITIES OKLAUNION	1	NEW	504.	PROCESS NOT SELECTED GE ENVIRONMENTAL SERVICES	12/86
TOTAL			9169.		

SECTION 12
SUMMARY OF PLANNED FGD SYSTEMS

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
LETTER OF INTENT SIGNED					
EAST KENTUCKY POWER J.K. SMITH	1	NEW	650.	LIME BABCOCK & WILCOX	8/87
IOWA ELECTRIC LIGHT & PWR GUTHRIE CO.	1	NEW	720.	LIMESTONE COMBUSTION ENGINEERING	11/87
KENTUCKY UTILITIES HANCOCK	1	NEW	650.	LIMESTONE BABCOCK & WILCOX	4/89
MIDDLE SOUTH UTILITIES ARKANSAS LIGNITE	5	NEW	890.	LIMESTONE COMBUSTION ENGINEERING	0/90
MIDDLE SOUTH UTILITIES ARKANSAS LIGNITE	6	NEW	890.	LIMESTONE COMBUSTION ENGINEERING	0/92
MIDDLE SOUTH UTILITIES UNASSIGNED	1	NEW	890.	LIMESTONE COMBUSTION ENGINEERING	0/89
MIDDLE SOUTH UTILITIES UNASSIGNED	2	NEW	890.	LIMESTONE COMBUSTION ENGINEERING	0/93
MIDDLE SOUTH UTILITIES WILTON	1	NEW	890.	LIMESTONE COMBUSTION ENGINEERING	0/88
MIDDLE SOUTH UTILITIES WILTON	2	NEW	890.	LIMESTONE COMBUSTION ENGINEERING	0/91
NEVADA POWER REID GARDNER	4	NEW	250.	SODIUM CARBONATE THYSSEN/CEA	4/83
NEW YORK STATE ELEC & GAS SOMERSET	1	NEW	625.	LIMESTONE PEABODY PROCESS SYSTEMS	6/84
TOTAL			8235.		
REQUESTING/EVALUATING BIDS					
CAJUN ELECTRIC POWER OXBOW	1	NEW	540.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/85
DESERET GEN & TRANS BONANZA	2	NEW	410.	LIMESTONE VENDOR NOT SELECTED	0/88
GENERAL PUBLIC UTILITIES COAL	1	NEW	625.	PROCESS NOT SELECTED VENDOR NOT SELECTED	5/91
GENERAL PUBLIC UTILITIES SEWARD	7	NEW	690.	PROCESS NOT SELECTED VENDOR NOT SELECTED	5/89
JACKSONVILLE ELEC AUTHORITY ST.JOHNS RIVER PWR PARK	1	NEW	600.	LIMESTONE VENDOR NOT SELECTED	12/85
JACKSONVILLE ELEC AUTHORITY ST.JOHNS RIVER PWR PARK	2	NEW	600.	LIMESTONE VENDOR NOT SELECTED	6/87
LOUISVILLE GAS & ELECTRIC TRIMBLE COUNTY	1	NEW	575.	PROCESS NOT SELECTED VENDOR NOT SELECTED	7/85
LOUISVILLE GAS & ELECTRIC TRIMBLE COUNTY	2	NEW	575.	PROCESS NOT SELECTED VENDOR NOT SELECTED	7/89
SOUTHERN INDIANA GAS & ELEC A.B. BROWN	2		265.	PROCESS NOT SELECTED VENDOR NOT SELECTED	1/85

SECTION 12
SUMMARY OF PLANNED FGD SYSTEMS

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
TEXAS UTILITIES FOREST GROVE	1	NEW	750.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/87
TOTAL			5630.		
CONSIDERING FGD SYSTEMS					
ATLANTIC CITY ELECTRIC CUMBERLAND	1	NEW	330.	PROCESS NOT SELECTED VENDOR NOT SELECTED	1/88
CAJUN ELECTRIC POWER CHICOT	1	NEW	562.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/86
CAJUN ELECTRIC POWER CHICOT	2	NEW	562.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/88
CAJUN ELECTRIC POWER CHICOT	3	NEW	562.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/92
CAJUN ELECTRIC POWER CHICOT	4	NEW	562.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/94
CAJUN ELECTRIC POWER OXBOW	2	NEW	540.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/85
CENTRAL ILLINOIS LIGHT DUCK CREEK	2	NEW	450.	LIMESTONE VENDOR NOT SELECTED	1/87
CENTRAL MAINE POWER SEARS ISLAND	1	NEW	600.	PROCESS NOT SELECTED VENDOR NOT SELECTED	11/89
CENTRAL POWER & LIGHT COLETO CREEK	2	NEW	720.	PROCESS NOT SELECTED VENDOR NOT SELECTED	9/92
CINCINNATI GAS & ELECTRIC EAST BEND	1	NEW	650.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/88
COLUMBUS & SOUTHERN OHIO ELEC POSTON	5	NEW	375.	PROCESS NOT SELECTED VENDOR NOT SELECTED	8/86
COLUMBUS & SOUTHERN OHIO ELEC POSTON	6	NEW	375.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/89
DELMARVA POWER & LIGHT VIENNA	9	NEW	550.	PROCESS NOT SELECTED VENDOR NOT SELECTED	5/88
FLORIDA POWER & LIGHT MARTIN	3	NEW	800.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/87
FLORIDA POWER & LIGHT MARTIN	4	NEW	800.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/89
GENERAL PUBLIC UTILITIES COAL	2	NEW	625.	PROCESS NOT SELECTED VENDOR NOT SELECTED	5/93
GENERAL PUBLIC UTILITIES COAL	3	NEW	625.	PROCESS NOT SELECTED VENDOR NOT SELECTED	5/95
GENERAL PUBLIC UTILITIES COAL	4	NEW	625.	PROCESS NOT SELECTED VENDOR NOT SELECTED	5/96
INDIANAPOLIS POWER & LIGHT PATRIOT	1	NEW	650.	LIMESTONE VENDOR NOT SELECTED	0/87
INDIANAPOLIS POWER & LIGHT PATRIOT	2	NEW	650.	LIMESTONE VENDOR NOT SELECTED	0/ 0

SECTION 12
SUMMARY OF PLANNED FGD SYSTEMS

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
INDIANAPOLIS POWER & LIGHT PATRIOT	3	NEW	650.	LIMESTONE VENDOR NOT SELECTED	0/ 0
KENTUCKY UTILITIES HANCOCK	2	NEW	650.	LIMESTONE VENDOR NOT SELECTED	4/94
LANSING BOARD OF WATER & LIGHT ERICKSON	2	NEW	160.	PROCESS NOT SELECTED VENDOR NOT SELECTED	1/87
LOS ANGELES DEPT OF WTR & PWR INTERMOUNTAIN	1	NEW	820.	LIME VENDOR NOT SELECTED	0/86
LOS ANGELES DEPT OF WTR & PWR INTERMOUNTAIN	2	NEW	820.	LIME VENDOR NOT SELECTED	0/87
LOS ANGELES DEPT OF WTR & PWR INTERMOUNTAIN	3	NEW	820.	LIME VENDOR NOT SELECTED	0/88
LOS ANGELES DEPT OF WTR & PWR INTERMOUNTAIN	4	NEW	820.	LIME VENDOR NOT SELECTED	0/89
LOWER COLORADO RIVER AUTH FAYETTE POWER PROJECT	3	NEW	435.	LIMESTONE VENDOR NOT SELECTED	0/88
NEBRASKA PUBLIC POWER DISTRICT FOSSIL III	1	NEW	650.	PROCESS NOT SELECTED VENDOR NOT SELECTED	3/92
NEVADA POWER HARRY ALLEN	1	NEW	500.	PROCESS NOT SELECTED VENDOR NOT SELECTED	6/86
NEVADA POWER HARRY ALLEN	2	NEW	500.	PROCESS NOT SELECTED VENDOR NOT SELECTED	6/87
NEVADA POWER HARRY ALLEN	3	NEW	500.	PROCESS NOT SELECTED VENDOR NOT SELECTED	6/88
NEVADA POWER HARRY ALLEN	4	NEW	500.	PROCESS NOT SELECTED VENDOR NOT SELECTED	6/89
NORTHERN STATES POWER METRO COAL	1	NEW	200.	LIME VENDOR NOT SELECTED	0/90
NORTHERN STATES POWER SHERBURNE	3	NEW	810.	LIME VENDOR NOT SELECTED	0/85
PACIFIC GAS & ELECTRIC MONTEZUMA	1	NEW	800.	LIMESTONE VENDOR NOT SELECTED	6/93
PACIFIC GAS & ELECTRIC MONTEZUMA	2	NEW	800.	LIMESTONE VENDOR NOT SELECTED	6/94
PACIFIC POWER & LIGHT JIM BRIDGER	1	RETROFIT	550.	SODIUM CARBONATE VENDOR NOT SELECTED	0/88
PACIFIC POWER & LIGHT JIM BRIDGER	2	RETROFIT	550.	SODIUM CARBONATE VENDOR NOT SELECTED	0/90
PACIFIC POWER & LIGHT JIM BRIDGER	3	RETROFIT	550.	SODIUM CARBONATE VENDOR NOT SELECTED	0/86
PWR AUTHORITY OF STATE OF NY FOSSIL		NEW	700.	PROCESS NOT SELECTED VENDOR NOT SELECTED	4/87
SALT RIVER PROJECT CORONADO	3	NEW	280.	LIMESTONE VENDOR NOT SELECTED	0/89
SOUTHWESTERN ELECTRIC POWER DOLET HILLS	2	NEW	720.	LIMESTONE VENDOR NOT SELECTED	0/88

SECTION 12
SUMMARY OF PLANNED FGD SYSTEMS

COMPANY NAME/ UNIT NAME	UNIT NO.	NEW OR RETROFIT	CAPACITY MW	PROCESS/ SYSTEM SUPPLIER	START-UP DATE
SOYLAND POWER SOYLAND	1	NEW	500.	PROCESS NOT SELECTED VENDOR NOT SELECTED	6/87
TEXAS UTILITIES MILL CREEK	1	NEW	750.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/87
TEXAS UTILITIES MILL CREEK	2	NEW	750.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/88
WASHINGTON WATER POWER CRESTON COAL	1	NEW	570.	LIMESTONE VENDOR NOT SELECTED	0/87
WASHINGTON WATER POWER CRESTON COAL	2	NEW	570.	LIMESTONE VENDOR NOT SELECTED	0/87
WASHINGTON WATER POWER CRESTON COAL	3	NEW	570.	LIMESTONE VENDOR NOT SELECTED	0/87
WASHINGTON WATER POWER CRESTON COAL	4	NEW	570.	LIMESTONE VENDOR NOT SELECTED	0/87
WEST TEXAS UTILITIES OKLAUNION	2	NEW	720.	PROCESS NOT SELECTED VENDOR NOT SELECTED	0/90
TOTAL			30398.		

SECTION 13
TOTAL FGD UNITS AND CAPACITY (MW) INSTALLED BY YEAR

YEAR	NEW ON LINE NO.	NEW ON LINE MW	TERMINATED NO.	TERMINATED MW	TOTAL ON LINE NO.	TOTAL ON LINE MW
1968	1	140.	0	0.	1	140.
1969	0	0.	1	140.	0	0.
1972	9	674.	0	0.	9	674.
1973	5	1514.	1	10.	13	2178.
1974	3	416.	3	340.	13	2254.
1975	7	2182.	5	628.	15	3808.
1976	7	2699.	4	1014.	18	5493.
1977	11	4589.	4	2049.	25	8033.
1978	14	4958.	0	0.	39	12991.
1979	20	6310.	2	143.	57	19158.
1980	20	6654.	0	0.	77	25812.
1981	11	4397.	0	0.	88	30209.
1982	20	7413.	0	0.	108	37622.
1983	14	5352.	0	0.	122	42974.
1984	9	5211.	0	0.	131	48185.
1985	13	6806.	0	0.	144	54991.
1986	9	5221.	0	0.	153	60212.
1987	20	12200.	0	0.	173	72412.
1988	13	7667.	0	0.	186	80079.
1989	11	6930.	0	0.	197	87009.
1990	4	2360.	0	0.	201	89369.
1991	2	1515.	0	0.	203	90884.
1992	4	2822.	0	0.	207	93706.
1993	3	2315.	0	0.	210	96021.
1994	3	2012.	0	0.	213	98033.
1995	1	625.	0	0.	214	98658.
1996	1	625.	0	0.	215	99283.
UNDEFINED	7	1806.				

APPENDIX A

FGD SYSTEM COST DATA: OPERATIONAL AND NONOPERATIONAL SYSTEMS

INTRODUCTION

The cost of flue gas desulfurization (FGD) systems is an area of intense interest and substantial controversy and few realistic cost figures have been established. Many cost figures (both capital and annual) are largely site-sensitive values. Such figures cannot be compared from one system to another because they refer to different FGD battery limits and different years in which the expenditures were made. This cost analysis was undertaken because of these concerns and the lack of comparable cost data.

Analysis is made only for operating FGD systems in this study because they potentially have complete and accurate economic data. Adjustments are made to provide comparable, accurate cost data for the sulfur dioxide portion of the emission control system. This, in effect, eliminates much of the confusion that exists concerning the reported data, and it provides a common basis for the reported costs.

The reported figures are acquired from various sources. The most reliable information was obtained from a previous cost study initiated by PEDCo Environmental in March 1978. In this first study each utility having at least one operational FGD system at the time was given a cost form containing all available cost information then in the PEDCo files. The utility was asked to verify the data and fill in any missing information. The PEDCo Environmental staff made a follow-up visit to complete and verify the data collected. Results of the cost analysis were then forwarded to each participating utility for final review and comment.

For this cost analysis, the primary source of reported cost information was the 1978 DOE Form 67. Utilities are generally required to complete this form, which includes capital and annual costs, once per year for operating stations. The 1978 forms were the most recent forms available. Although the information included in the DOE Form 67 is not as specific and is formatted differently than the PEDCo forms, the figures were fitted as well as possible.

Some costs were also taken from FGD cost survey questionnaires developed by Edison Electric Institute. The EEI forms contain useful capital cost information, however, in some cases the costs were projections rather than actual dollar expenditures.

In addition to the sources just mentioned, some 1978 and 1979 annual costs were made available by a few utilities via written transmittals and telephone communications.

Draft forms were assembled based on these sources and sent to each utility involved in this study. Each utility was then contacted and asked to respond as to the validity of the figures included in the drafts. Corrections were then made and it was assumed that the figures collected provided a firm base to make adjustments. In general, it was possible to determine the scope of the reported costs so that estimates could be made for missing costs, and non-FGD-related costs could be deleted. In cases where this was not possible, assumptions were made as to what items were and what were not included in the total figures, and the adjustments were based on these assumptions.

The adjustment procedure is summarized below:

CAPITAL COSTS

- All costs associated with control of particulate matter emissions are deducted.
- Capital costs for modifications necessitated by installation of an FGD system are added if they were not included in the reported costs.
- Sludge disposal costs are adjusted to reflect a 20-year life span for retrofit FGD systems and a 30-year life span for new FGD systems.
- Any unreported direct and indirect costs incurred are estimated and included.
- All capital costs are escalated to 1980 dollars.
- All $/kW values reflect the gross generating capacity of the unit.

ANNUAL COSTS

- All non-labor costs are adjusted to a common 65 percent capacity factor.
- Direct costs that were not reported are estimated and added.
- Overhead and fixed costs that were not reported are estimated and added.

- All annual costs are escalated to 1980 dollars.
- The final mills/kWh figure for each cost study is based on a standard 65 percent capacity factor and the net generating capacity of the unit.

A more complete description of the cost adjustment procedure may be found in the section titled Cost Adjustment Procedure and Background of this Appendix (Page A-9). The results of the cost analysis are listed in the section that follows. Section A-1 summarizes the reported and adjusted capital and annual costs for all the operational FGD systems that were addressed in the cost study. Also included in this section are the standardized adjusted annual costs (see Page A-18). Section A-2 summarizes available cost data for nonoperational FGD systems.

RESULTS OF THE COST ANALYSIS

The results of the operational FGD system survey are summarized in Tables A-1 and A-2. Table A-1 summarizes the reported and adjusted capital and annual costs for all the operational FGD systems addressed in the survey. Table A-2 provides a summary of a categorical analysis of the reported and adjusted capital and annual costs for the operational FGD systems addressed in the survey. Included in this categorical analysis are the ranges, means, and standard deviation for all the various types and categories of FGD systems examined.

TABLE A-1. REPORTED AND ADJUSTED CAPITAL AND ANNUAL COSTS FOR OPERATIONAL FGD SYSTEMS

	Reported				Adjusted			
	Capital	$/kw	Annual	Mills/kwh	Capital	$/kw	Annual	Mills/kwh
Alabama Electric								
Tombigbee 2	6,992,100	27.4	434,929	0.33	8,949,750	35.1	3,896,950	2.91
Tombigbee 3	6,992,100	27.4	434,929	0.33	8,949,750	35.1	3,396,950	2.91
Arizona Electric Power								
Apache 2	8,148,069	41.8	51,784	0.05	12,081,900	62.0	3,431,400	3.44
Apache 3	7,214,052	37.0	51,784	0.05	11,380,300	58.4	3,431,400	3.44
Arizona Public Service								
Cholla 1	6,550,000	52.0	NA	NA	9,400,200	74.6	3,034,800	4.23
Cholla 2	44,352,000	168.0	1,003,568	0.75	39,248,800	146.7	10,099,300	7.55
Central Illinois Light								
Duck Creek 1	31,125,000	78.4	10,851,000	5.04	58,416,200	140.4	17,143,200	7.96
Central Illinois Public Service								
Newton 1	107,831,000	174.8	NA	NA	149,380,600	242.1	42,020,300	12.83
Columbus & Southern Ohio Electric								
Conesville 5	20,663,500	50.3	8,670,530	5.52	37,473,700	91.2	13,357,600	6.26
Conesville 6	20,663,500	50.3	8,670,530	5.52	37,473,700	91.2	13,357,600	6.26
Duquesne Light								
Elrama 1-4	61,320,000	120.2	21,027,451	7.18	37,849,400	172.3	32,916,500	11.87
Phillips 1-6	52,055,000	127.0	18,301,000	11.32	78,991,900	192.7	31,025,700	16.27
Indianapolis Power & Light								
Petersburg 3	55,820,000	104.9	NA	NA	79,103,100	148.7	26,275,600	8.96
Kansas City Power & Light								
Hawthorn 3	3,220,000	29.4	346,441	1.15	6,329,650	57.5	2,612,450	4.71
Hawthorn 4	3,220,000	29.4	346,441	1.15	6,329,650	57.5	2,612,450	4.71
LaCygne 1	46,900,000	53.7	8,060,047	5.38	80,279,100	91.9	48,739,200	10.44
Kansas Power & Light								
Jeffrey 1	27,306,900	37.9	321,000	0.11	36,170,300	50.2	8,528,400	2.20
Kentucky Utilities								
Green River 1-3	3,966,155	62.0	364,005	5.20	6,916,800	100.1	3,467,900	10.15
Louisville Gas & Electric								
Cane Run 4	12,647,000	66.6	960,301	1.29	20,073,800	105.7	5,448,000	5.26
Cane Run 5	13,759,000	68.8	763,443	0.92	18,703,000	93.9	5,314,600	4.87
Cane Run 6	20,596,900	71.5	NA	NA	23,204,500	80.6	9,133,500	5.96
Mill Creek 3	18,846,000	42.6	321,463	1.25	26,751,200	60.5	8,855,500	3.70
Paddy's Run 6	4,320,300	61.7	NA	NA	8,540,200	122.0	4,079,300	11.28
Minnesota Power Cooperative								
Milton R. Young 2	44,119,600	100.3	754,445	0.53	62,072,700	142.9	13,743,100	5.75
Monongahela Power								
Pleasants 1	65,693,100	106.3	9,015,379	2.73	70,058,000	113.4	26,145,300	7.92
Montana Power								
Colstrip 1	36,500,000	101.4	6,128,000	2.97	48,183,200	133.8	14,398,500	7.62
Colstrip 2	36,500,000	101.4	6,128,000	2.97	48,183,200	133.8	14,398,500	7.62
Nevada Power								
Reid Gardner 1	5,363,375	42.9	251,514	0.46	9,993,000	79.9	3,314,750	5.29
Reid Gardner 2	5,363,375	42.9	251,514	0.46	9,993,000	79.9	3,314,750	5.29
Reid Gardner 3	12,599,160	100.8	131,824	0.23	17,307,000	138.5	4,247,300	6.78
Northern Indiana Public Service								
Dean H. Mitchell 11	18,192,040	157.4	2,414,589	13.02	26,999,900	233.6	9,991,300	18.67
Northern States Power								
Sherburne 1	34,982,020	49.3	2,716,759	0.75	67,996,050	94.4	19,338,820	4.99
Sherburne 2	34,982,020	49.3	2,716,759	0.75	67,996,050	94.4	19,338,820	4.99
Pacific Power & Light								
Jim Bridger 4	49,643,000	90.3	NA	NA	59,732,500	108.6	17,854,100	6.71
Pennsylvania Power								
Bruce Mansfield 1	110,639,000	120.7	9,979,900	3.28	121,306,350	132.3	50,794,500	10.81
Bruce Mansfield 2	110,639,000	120.7	9,979,900	3.28	121,306,350	132.3	50,794,500	10.81
Public Service Company of New Mexico								
San Juan 1	47,944,400	132.8	NA	NA	92,034,200	254.9	27,227,100	15.23
San Juan 2	47,985,000	137.1	NA	NA	90,608,100	258.9	26,852,900	15.41
South Carolina Public Service Authority								
Winyah 2	6,646,098	23.7	527,000	0.29	12,060,100	43.1	2,476,200	1.69
South Mississippi Electric								
R.D. Morrow 1	10,896,000	53.7	NA	NA	22,056,750	103.7	6,513,850	6.36
R.D. Morrow 2	10,896,000	53.7	NA	NA	22,056,750	103.7	6,513,850	6.36
Southern Illinois Power Coop								
Marion 4	15,200,930	87.9	859,453	0.98	19,177,500	110.9	6,525,500	7.12
Southern Indiana Gas & Electric								
A.B. Brown 1	12,495,000	47.2	1,850,565	1.30	21,477,900	81.0	6,534,600	4.59
Springfield City Utilities								
Southwest 1	16,744,500	86.3	778,749	1.20	25,904,900	133.5	7,490,000	7.60
Tennessee Valley Authroity								
Widows Creek 8	47,900,000	87.1	14,576,400	7.76	79,785,300	145.1	19,572,000	6.66
Utah Power & Light								
Hunter 1	24,400,000	56.7	NA	NA	29,625,000	68.9	9,740,100	4.28
Huntington 1	27,090,000	63.0	2,946,400	1.27	35,498,200	82.6	12,317,200	5.41

NA - Annual costs not available from the utility.

TABLE A-2. CATEGORICAL RESULTS OF THE REPORTED AND ADJUSTED CAPITAL AND ANNUAL COSTS FOR OPERATIONAL FGD SYSTEMS

	Reported						Adjusted					
	Capital			Annual			Capital			Annual		
	Range, $/kW	Average, $/kW	σ	Range, mills/kWh	Average, mills/kWh	σ	Range, $/kW	Average, $/kW	σ	Range, mills/kWh	Average, mills/kWh	σ
All	23.7-243.0	79.1	45.4	0.05-13.02	2.64	3.14	35.1-258.9	113.5	54.6	1.69-18.67	7.27	3.82
New	23.7-243.0	77.5	47.2	0.05-5.52	1.84	1.84	35.1-242.1	103.8	43.3	1.69-12.83	6.31	2.68
Retrofit	29.4-157.4	83.2	41.4	0.46-13.02	4.54	4.64	57.5-258.9	132.3	69.4	4.23-18.67	9.12	4.99
Saleable	132.8-185.0	153.0	23.8	13.02-13.02	13.02	0.0	233.6-258.9	249.1	13.6	15.23-18.67	16.44	1.94
Throwaway	23.7-243.0	73.7	41.8	0.05-11.32	2.35	2.65	35.1-242.1	104.2	42.5	1.69-16.27	6.64	3.03
Alkaline flyash/lime	100.3-101.4	101.0	0.6	0.53-2.97	2.16	1.41	133.8-142.9	136.8	5.2	5.75-7.62	6.99	1.08
Alkaline flyash/ limestone	49.3-49.3	49.3	0.0	0.75-0.75	0.75	0.0	94.4-94.4	94.4	0.0	4.99-4.99	4.99	0.0
Dual alkali	47.2-174.8	97.8	67.7	1.30-1.30	1.30	0.0	80.6-242.1	134.6	93.1	4.59-12.83	7.79	4.41
Lime	29.4-243.0	80.1	50.6	0.92-11.32	3.65	3.02	57.5-192.7	105.1	39.1	3.70-16.27	7.79	3.63
Limestone	23.7-168.0	65.0	34.9	0.05-7.76	1.78	2.54	35.1-148.7	93.4	42.5	1.69-10.44	5.61	2.65
Sodium carbonate	42.9-100.8	69.2	30.7	0.23-0.46	0.38	0.13	79.9-138.5	101.7	28.0	5.29-6.78	5.88	0.73
Wellman Lord	132.8-185.0	153.1	23.8	13.02-13.02	13.02	0.0	233.6-258.9	249.1	13.6	15.23-18.67	16.44	1.94

COST ADJUSTMENT PROCEDURE AND BACKGROUND

The cost data were treated solely to establish accurate costs for FGD systems, on a common basis, not to critique the design or reasonableness of the costs reported by any utility. Adjustments focus primarily on the following items:

- All capital costs are adjusted to mid-1980 dollars using the escalation factors shown in Table A-3. Actual costs were reported by utilities in dollar values for years 1970 to 1980. The total figure is broken down into dollars/year and each year total is escalated to 1980 dollars and totaled again. All capital costs, represented in dollars/kilowatt ($/kW), are expressed in terms of gross megawatts (MW).
- Gross unit capacity is used to express all FGD capital expenditures because the capital requirement of an FGD system is dependent on actual boiler size before derating for auxiliary and air quality control power requirements.
- Particulate control costs are deducted. Since the purpose of the study is to estimate the incremental cost for sulfur dioxide control, particulate control costs deducted using either data contained in the costs breakdowns or as a percentage of the total direct cost (capital and annual). The percentage reduction varies depending upon system design and operation.
- The capital costs associated with the modification or installation of equipment not part of the FGD system but needed for its proper functioning, are included (e.g., stack lining, modification to existing ductwork or fans, etc.).
- Indirect charges are adjusted to provide adequate funds for engineering, field expenses, legal expenses, insurance, interest during construction, allowance for startup, taxes, and contingency expenditures.

TABLE A-3. ESCALATION FACTORS

Year[a]	Capital investment[b]	Utilities[c]	Chemicals[d]	O&M labor[e]	Construction labor[f]
1970	0.537	0.238	0.550	0.540	0.542
1971	0.576	0.277	0.584	0.583	0.613
1972	0.600	0.321	0.603	0.630	0.669
1973	0.624	0.372	0.624	0.681	0.704
1974	0.738	0.496	0.733	0.735	0.768
1975	0.825	0.665	0.819	0.794	0.824
1976	0.875	0.762	0.866	0.857	0.887
1977	0.934	0.873	0.928	0.926	0.937
1978	1.000	1.000	1.000	1.000	1.000
1979	1.090	1.100	1.075	1.080	1.080
1980	1.188	1.210	1.156	1.166	1.166
1981	1.295	1.331	1.242	1.260	1.260
1982	1.412	1.464	1.335	1.360	1.360
1983	1.539	1.611	1.436	1.470	1.470
1984	1.677	1.772	1.543	1.587	1.587
1985	1.828	1.949	1.659	1.714	1.714

[a] Cost index is for mid year (June).

[b] Reference: Marshall and Swift.

[c] Includes fuel and electricity; reference: Department of Commerce.

[d] Reference: Bureau of Mines.

[e] Reference: Department of Labor.

[f] Reference: Engineering News Record.

- All annual costs, represented in mills/kilowatt-hour (mills/kWh), are expressed in terms of net megawatts (MW).
- Net unit capacity is used to express all FGD annual expenditures because the annual cost requirement of an FGD system is dependent on the actual number of kilowatt-hours (kWh) produced by the unit after derating for auxiliary and air quality control power requirements.
- All non-labor annual costs are adjusted to a common 65 percent capacity factor.
- Replacement power costs for retrofitted FGD systems* are not included since only a few utilities reported such costs and these were presented using a variety of methods.
- Sludge disposal costs are adjusted to reflect the costs of sulfur dioxide waste disposal only (i.e., excluding fly ash disposal except where usable as a sludge stabilizing agent) and to provide for disposal over the anticipated lifetime of the FGD system. This latter correction is necessary since several utilities reported costs for sludge disposal capacity that would last only a fraction of the FGD system life. The adjustments are based on a land cost of $2000/acre with a sludge depth of 50 ft in a clay-lined pond (clay is assumed to be available at the site).
- A 30-year life is assumed for all process and economic considerations for all new systems that were installed for the life of the unit. A 20-year life is assumed for all process and economic considerations for retrofit systems that were installed for the remaining portion of the life of the unit.**

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*If an FGD system is retrofitted to an existing boiler the new electrical power demand of the FGD equipment will decrease the boiler net MW rating. Since the boiler was originally sized and designed to accommodate a certain grid demand, the utility may be forced to buy make-up power from the grid and/or increase the design capacity of planned boilers.

**The use of a 30-year service life for new units coincides with the conclusion of the National Power Survey of the Federal Power Commission which recognized this value as reasonable for steam-electric plants. A 20-year service life was assumed for all retrofit units even if the remaining life of the units is less than this value. Thus, two different rates are used and should be noted when making comparisons between new and retrofit systems.

- Regeneration and by-product recovery facility costs are added for those regenerable systems not reporting such costs.

To the extent possible, all cost adjustments are made using the previous assumptions developed by PEDCo Environmental. When cost data are inadequate, adjustments are made using process design data in conjunction with the previous cost assumptions. In some cases, adjustments are not possible because of insufficient data.

DESCRIPTION OF COST ELEMENTS

Capital costs consist of direct costs, indirect costs, and other capital costs (including contingency). Direct costs include the "bought-out" cost of the equipment, the cost of installation, and site development. Indirect costs include interest during construction, contractor's fees and expenses, engineering, legal expenses, taxes, insurance, allowance for start-up and shakedown, and spares. Contingency costs include those costs resulting from malfunctions, equipment alterations, and similar unforeseen sources. Other capital costs include the nondepreciable items of land and working capital.

Annual costs consist of direct costs, fixed costs, and overhead costs. Direct costs include the cost of raw materials, utilities, operating labor and supervision, and maintenance and repairs. Fixed costs include those of depreciation, interim replacement, insurance, taxes, and interest on borrowed capital. Overhead costs include those of plant and payroll expenses. The various capital and annual cost components are discussed and defined in greater detail in the text that follows.

CAPITAL COSTS

Direct Capital Costs

The direct capital costs include the following elements:

- Equipment required for the FGD system. Table A-4 provides a summary of the major process equipment used in FGD systems.
- Installation of equipment, including foundations; steel work for support, buildings, piping and ducting for effluents, slurries, sludge, and make-up water, control panels, instrumentation, insulation of ducting, buildings, piping, and other equipment, painting and piling.
- Site development may include clearing and grading, construction of access roads and walkways, establishment of rail, barge, and/or truck facilities, and parking facilities.

Indirect Capital Costs

Indirect capital costs include the following elements:

- Interest accrued on borrowed capital during construction.
- Contractor's fee and expenses, including costs for field labor payroll; field office supervision; personnel; construction offices; temporary roadways; railroad trackage; maintenance and welding shops; parking lot; communications; temporary piping and electrical and sanitary facilities; safety security (fire, material, medical, etc.); construction tools and rental equipment; unloading and storage of materials; travel expenses; permits; licenses; taxes; insurance; overhead; legal liabilities; field testing of equipment; start-up; and labor relations.
- Engineering costs, including administrative, process, project, and general; design and related functions for specifications; bid analysis; special studies; cost analysis; accounting; reports; consultant fees; purchasing; procurement; travel expenses; living expenses; expediting; inspection; safety; communications; modeling; pilot plant studies (if required because of

TABLE A-4. MAJOR FGD SYSTEM EQUIPMENT SUMMARY

Category	Description
Material handling - raw materials	Equipment for the handling and transfer of raw materials includes unloading facilities, conveyors, storage areas and silos, vibrators, atmospheric emission control associated with these facilities, and related accessories
Feed preparation - raw materials	Equipment for the preparation of raw material to produce a feed slurry consists of feed weighers, crushers, grinders, classifiers, ball mills, mixing tanks, pumps, agitators, and related accessories
Sulfur dioxide absorption	Equipment for treating the flue gas includes absorbers, mist eliminators, hold tanks, agitators, circulating pumps, pond water return pumps, and related accessories
Flue gas reheat	Equipment required includes air, steam, or hot water heaters, condensate tanks, pumps, soot blowers, fans, fuel storage facilities, gas bypass equipment, and related accessories
Gas handling	Equipment to handle the boiler flue gas includes booster fans, ductwork, flue gas bypass system, turning vanes, supports, platforms, and related accessories
Sludge disposal	FGD systems that do not generate a salable product require solids/water separation equipment such as clarifiers, vacuum filters, centrifuges, sludge fixation equipment, and related accessories
Utilities	Equipment to supply power and water to the FGD equipment consists of switch-gear, breakers, transformers, piping, and related accessories
By-product handling	Equipment for processing the by-product of regenerable FGD systems may include a rotary kiln, fluid bed dryer, conveyor, storage silo, vibrator, combustion equipment and oil storage tanks, waste heat boilers, hammer mills, evaporators, crystallizers, strippers, tanks, agitators, pumps, compressors, sulfuric acid absorber and cooling, mist eliminator, pumps, acid coolers, tanks, etc.

(continued)

TABLE A-4 (continued)

Category	Description
Regeneration	Equipment for regeneration of the absorbing medium of an FGD system may consist of reactor vessels, material handling system, storage, weigh feeder, conveyor, rotary kiln, fluid bed calciner, dust collector, storage silo, vibrator, combustion equipment and oil storage tanks, waste heat boiler, hammer mill, evaporators, crystallizers, strippers, tanks, agitators, pumps, compressors, sulfuric acid absorber and cooling, mist eliminator, pumps, acid coolers, tanks, etc.
Purge treatment	Equipment for the removal of purge material (e.g., sodium sulfate) includes refrigeration, pumps, tanks, crystallizer, centrifuge, dryer, dust collector, conveyors, storage, and related equipment
Auxiliary	Equipment not directly related to the FGD system, but which may require design or modification to accommodate an FGD system may include such items as existing fans, ducts, or stack. If new fans, ducts, or stacks are added to improve boiler performance and accommodate the FGD system, the costs are prorated to the boiler and FGD system

process design or application novelty); royalty payments during construction; training of plant personnel; field engineering; safety engineering; and consultant services.

- Legal expenses, including those for securing permits, right-of-way, etc.
- Taxes, including sales, and excise taxes.
- Insurance covering liability for equipment in transit and at site; fire, casualty, injury, and death; damage to property; delay; and noncompliance.
- Allowance for start-up and shakedown includes the cost associated with system start-up.
- Spare parts including pumps, valves, controls, special piping and fittings, instruments, spray nozzles, and similar items.

Other Capital Costs

Other capital costs include the following elements:

- Contingency funds set aside for any necessary repairs and/or modifications not covered in projected direct expenditures.
- Land required for the FGD process, waste disposal, regeneration facility, and storage.
- Working capital, including the total amount of money invested in raw materials and supplies in stock, finished products in stock, and unfinished products in the process of being manufactured; accounts receivable; cash kept on hand for payment of operating expenses such as salaries, wages, and raw materials purchases; accounts payable; and taxes payable.

ANNUAL COSTS

The annual cost of an FGD system includes the following direct, fixed and overhead charges:

Direct Costs

- Raw materials, including those required by the FGD process for sulfur dioxide control, absorbent regeneration, sludge treatment, sludge fixation, flocculants, etc.

- Utilities, including water for slurries, cooling and cleaning; electricity for pumps, fans, valves, lighting controls, conveyors, and mixers; fuel for reheating of flue gases; and steam for processing.
- Operating labor, including supervision, skilled, and unskilled labor required to operate, monitor, and control the FGD process.
- Maintenance and repairs, consisting of both manpower and materials to keep the unit operating efficiently. The function of maintenance is both preventive and corrective to keep outages to a minimum.
- Byproduct sales, credit from the sale of byproducts regenerable FGD processes (e.g., sulfur, sulfuric acid) is a negative charge deducted from the annual direct cost to obtain the net annual direct cost of the FGD system.

Overhead

Plant and administrative overhead is a business expense that is not charged directly to a particular part of a project, but is allocated to it. Overhead costs include administrative, safety, engineering, legal and medical services; payroll; employee benefits; recreation; and public relations.

Fixed Charges

- Depreciation - the annual charge to recover direct and indirect costs of physical assets over the life of the asset.
- Interim replacement - costs expended for temporary or provisional replacement of equipment that has failed or malfunctioned prematurely.
- Insurance - including the costs of protection from loss by a specified contingency, peril, or unforeseen event. Required coverage could include losses due to fire, personel injury or death, property damage, explosion, lightning, or other natural phenomena.
- Taxes - including franchises, excise, and property taxes levied by a city, county, state, or Federal government.
- Interest - on borrowed funds.

Table A-5 provides a summary of the means used to determine the missing cost elements if the costs were not reported or insufficient information prevented their actual determination. The assumptions and cost bases for determining the capital and annual costs of FGD systems were developed by the PEDCo staff based upon previous economic studies conducted for the U.S. EPA (Flue Gas Desulfurization Process Cost Assessment, May 1975; Simplified Procedures for Estimating Flue Gas Desulfurization System Costs, June 1976, EPA-600/2-76-150; Particulate and Sulfur Dioxide Emission Control Costs for Large Coal-Fired Boilers, March 1978, EPA-600/7-78-032).

STANDARDIZED ADJUSTED ANNUAL COST

In an attempt to promote further comparability of the figures, the adjustment procedure was carried one step further and standardized adjusted figures were developed. This was done by modifying the fixed annual cost rates such that they would be identical for each unit (i.e., cost of depreciation, interim replacement, taxes, insurance, and capital costs). The newly adjusted total fixed annual cost rate was applied to the total adjusted capital cost in each case and a standardized adjusted annual cost was obtained.

TABLE A-5. COST ELEMENT FACTORS

Category	Value
Indirect capital costs:	
Interest during construction	10% of total direct capital costs
Field overhead	10% of total direct capital costs
Contractor's fee and expenses	5% of total direct capital costs
Engineering	10% of total direct capital costs
Taxes	2% of total direct capital costs
Spares	1% of total direct capital costs
Shakedown allowance	5% of total direct capital costs
Other capital costs:	
Contingency[a]	20% of total direct and indirect capital costs
Direct annual costs:	
Raw materials:	
Fixation chemicals	\$3.50/ton
Lime[b]	\$46/ton
Lime (magnesium promoted)	\$61/ton \$52/ton[c]
Limestone	\$11.60/ton
Magnesium oxide	\$266/ton
Sodium carbonate	\$110/ton
Salt cake (credit)	\$60/ton
Sulfur (credit)	\$87/ton
Sulfuric acid (credit)	\$35/ton
Utilities:	
Electricity	\$30 mills/kWh
Water	\$0.24/10^3 gal
Steam	\$1.45/10^6 Btu

(continued)

TABLE A-5 (continued)

Category	Value
Operating labor:	
Direct labor	$13.30/man-hour
Supervision	15% of direct labor costs
Maintenance:	
Labor and materials	4% of total direct capital costs
Supplies	15% of labor and materials costs
Overhead:	
Plant	50% of operation and maintenance costs
Payroll	20% of operating labor costs
Fixed annual costs:	
Depreciation	3.33% or 5% (new or retrofit)
Interim replacement[d]	0.7% or 0.35%
Taxes	4%
Insurance	0.3%
Capital costs	9%

[a] Contingency costs are used only when the cost data supplied are incomplete (such as equipment costs or direct costs only) and a contingency cost must be factored in to give an accurate estimate of the total capital cost.

[b] Estimated cost for carbide lime used by Louisville Gas and Electric was $13.30/ton in 1978. This was escalated to $15.40/ton for 1980.

[c] Long term contract (e.g., Dravo contract).

[d] Some system components have life spans less than the expected service life of the system. Interim replacement is an allowance factor used in estimating annual revenue requirements to provide for the replacement of these short-lived items. An average allowance of 0.35% of the total investment is normally provided and used for systems with an expected service life of 20 years or less. A higher allowance of 0.70% of the total investment is provided and used for systems with an expected service life of 30 years or more.

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST REPORTED	 ADJUSTED	 STANDARDIZED ADJUSTED
ALABAMA ELECTRIC	CAPACITY FACTOR, %	65	65	65
TOMBIGBEE 2	DIRECT CAPITAL, $	5826750.	**********	**********
NEW 255MW (GROSS)	INDIRECT CAPITAL, $	1165350.	**********	**********
STARTUP 9/78 179MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	27.4(1978)	35.1(1980)	35.1(1980)
1.15 %S BITUMINOUS	DIRECT ANNUAL, $	434929.	2038050.	2038050.
LIMESTONE	OVERHEAD COST, $	**********	307900.	307900.
PEABODY PROCESS SYSTEMS	FIXED CHARGES, $	**********	1551000.	1551000.
ENERGY CONSUMPTION: 3.1%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.3(1978)	2.9(1980)	2.9(1980)
ALABAMA ELECTRIC	CAPACITY FACTOR, %	65	65	65
TOMBIGBEE 3	DIRECT CAPITAL, $	5826750.	**********	**********
NEW 255MW (GROSS)	INDIRECT CAPITAL, $	1165350.	**********	**********
STARTUP 6/79 179MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	27.4(1978)	35.1(1980)	35.1(1980)
1.15 %S BITUMINOUS	DIRECT ANNUAL, $	**********	2038050.	2038050.
LIMESTONE	OVERHEAD COST, $	434929.	307900.	307900.
PEABODY PROCESS SYSTEMS	FIXED CHARGES, $	**********	1551000.	1551000.
ENERGY CONSUMPTION: 3.1%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.3(1978)	2.9(1980)	2.9(1980)
ARIZONA ELECTRIC POWER	CAPACITY FACTOR, %	65	65	65
APACHE 2	DIRECT CAPITAL, $	6154982.	**********	**********
NEW 195MW (GROSS)	INDIRECT CAPITAL, $	1895044.	**********	**********
STARTUP 8/78 98MW (ESC)	OTHER CAPITAL, $	78949.	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	41.8(1977)	62.0(1980)	62.0(1980)
.50 %S BITUMINOUS	DIRECT ANNUAL, $	48237.	1437300.	1437300.
LIMESTONE	OVERHEAD COST, $	3547.	20300.	20300.
RESEARCH-COTTRELL	FIXED CHARGES, $	**********	1973800.	1973800.
ENERGY CONSUMPTION: 4.1%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1979)	3.4(1980)	3.4(1980)
ARIZONA ELECTRIC POWER	CAPACITY FACTOR, %	65	65	65
APACHE 3	DIRECT CAPITAL, $	5449433.	**********	**********
NEW 195MW (GROSS)	INDIRECT CAPITAL, $	1677814.	**********	**********
STARTUP 6/79 98MW (ESC)	OTHER CAPITAL, $	69899.	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	37.0(1977)	58.4(1980)	58.4(1980)
.50 %S BITUMINOUS	DIRECT ANNUAL, $	48237.	1437300.	1437300.
LIMESTONE	OVERHEAD COST, $	3547.	20300.	20300.
RESEARCH-COTTRELL	FIXED CHARGES, $	**********	1973800.	1973800.
ENERGY CONSUMPTION: 4.1%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1979)	3.4(1980)	3.4(1980)
ARIZONA PUBLIC SERVICE	CAPACITY FACTOR, %	***	65	65
CHOLLA 1	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 119MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 10/73 119MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	52.0(1973)	74.6(1980)	74.6(1980)
.50 %S BITUMINOUS	DIRECT ANNUAL, $	**********	1322600.	1322600.
LIMESTONE	OVERHEAD COST, $	**********	346500.	346500.
RESEARCH-COTTRELL	FIXED CHARGES, $	**********	1365700.	1213700.
ENERGY CONSUMPTION: 3.4%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	4.2(1980)	4.0(1980)
ARIZONA PUBLIC SERVICE	CAPACITY FACTOR, %	65	65	65
CHOLLA 2	DIRECT CAPITAL, $	**********	**********	**********
NEW 264MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 4/78 264MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	168.0(1977)	148.7(1980)	148.7(1980)
.50 %S BITUMINOUS	DIRECT ANNUAL, $	1003568.	2785200.	2785200.
LIMESTONE	OVERHEAD COST, $	**********	512300.	512300.
RESEARCH-COTTRELL	FIXED CHARGES, $	**********	6801800.	6801800.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.8(1978)	7.5(1980)	7.5(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST		
		REPORTED	ADJUSTED	STANDARDIZED ADJUSTED
ARIZONA PUBLIC SERVICE	CAPACITY FACTOR, %	***	65	65
CHOLLA 4	DIRECT CAPITAL, $	28000000.	**********	**********
NEW 375MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 3/81 126MW (ESC	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	80.0(0)	******(0)	******(0)
.50 %S	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
RESEARCH-COTTRELL	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
BASIN ELECTRIC POWER	CAPACITY FACTOR, %	***	65	65
LARAMIE RIVER 1	DIRECT CAPITAL, $	33600000.	**********	**********
NEW 570MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 7/80 570MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	56.0(1980)	******(0)	******(0)
.81 %S SUBBITUMINOUS	DIRECT ANNUAL, $	2818530.	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
RESEARCH-COTTRELL	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.9(7800)	******(0)	******(0)
BASIN ELECTRIC POWER	CAPACITY FACTOR, %	***	65	65
LARAMIE RIVER 2	DIRECT CAPITAL, $	33600000.	**********	**********
NEW 570MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 7/81 570MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	56.0(1980)	******(0)	******(0)
.81 %S SUBBITUMINOUS	DIRECT ANNUAL, $	2818530.	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
RESEARCH-COTTRELL	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.9(7800)	******(0)	******(0)
BIG RIVERS ELECTRIC	CAPACITY FACTOR, %	***	65	65
GREEN 1	DIRECT CAPITAL, $	10454400.	**********	**********
NEW 242MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 12/79 242MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	43.2(1976)	******(0)	******(0)
3.75 %S BITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIME	OVERHEAD COST, $	**********	**********	**********
AMERICAN AIR FILTER	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
CENTRAL ILLINOIS LIGHT	CAPACITY FACTOR, %	65	65	65
DUCK CREEK 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 416MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 7/76 416MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	74.8(1977)	140.4(1980)	140.4(1980)
3.66 %S BITUMINOUS	DIRECT ANNUAL, $	5163000.	10900200.	10900200.
LIMESTONE	OVERHEAD COST, $	**********	555000.	555000.
ENVIRONEERING, RILEY STOKER	FIXED CHARGES, $	**********	5688000.	10123500.
ENERGY CONSUMPTION: 2.9%	TOTAL ANNUAL, MILLS/KWH(YEAR)	5.0(1980)	8.0(1980)	10.0(1980)
CENTRAL ILLINOIS PUBLIC SERV	CAPACITY FACTOR, %	***	65	65
NEWTON 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 617MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 9/79 617MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	174.8(1978)	242.1(1980)	242.1(1980)
2.25 %S BITUMINOUS	DIRECT ANNUAL, $	**********	12394300.	12394300.
DUAL ALKALI	OVERHEAD COST, $	**********	3737000.	3737000.
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	25889000.	25889000.
ENERGY CONSUMPTION: 2.4%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	12.8(1980)	12.8(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST REPORTED	 ADJUSTED	 STANDARDIZED ADJUSTED
CINCINNATI GAS & ELECTRIC	CAPACITY FACTOR, %	***	65	65
EAST BEND 2	DIRECT CAPITAL, $	78000000.	**********	**********
NEW 650MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 3/81 650MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	120.0(0)	******(0)	******(0)
3.00 %S	DIRECT ANNUAL, $	11718252.	**********	**********
LIME	OVERHEAD COST, $	**********	**********	**********
BABCOCK & WILCOX	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 2.9%	TOTAL ANNUAL, MILLS/KWH(YEAR)	3.4(7800)	******(0)	******(0)
COLORADO UTE ELECTRIC	CAPACITY FACTOR, %	***	65	65
CRAIG 1	DIRECT CAPITAL, $	38665500.	**********	**********
NEW 455MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 10/80 410MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	86.5(1979)	******(0)	******(0)
.45 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
PEABODY PROCESS SYSTEMS	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 1.3%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
COLORADO UTE ELECTRIC	CAPACITY FACTOR, %	***	65	65
CRAIG 2	DIRECT CAPITAL, $	32943900.	**********	**********
NEW 455MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 12/79 410MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	73.7(1979)	******(0)	******(0)
.45 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
PEABODY PROCESS SYSTEMS	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: -2.0%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
COLUMBUS & SOUTHERN OHIO ELEC	CAPACITY FACTOR, %	48	65	65
CONESVILLE 5	DIRECT CAPITAL, $	20663500.	29391150.	29391150.
NEW 411MW (GROSS)	INDIRECT CAPITAL, $	**********	8082550.	8082550.
STARTUP 1/77 411MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	50.3(1975)	91.2(1980)	91.2(1980)
4.67 %S BITUMINOUS	DIRECT ANNUAL, $	4724280.	6474800.	6474800.
LIME	OVERHEAD COST, $	443800.	517450.	517450.
AIR CORRECTION DIVISION, UOP	FIXED CHARGES, $	**********	6365350.	6494200.
ENERGY CONSUMPTION: 3.9%	TOTAL ANNUAL, MILLS/KWH(YEAR)	5.5(1978)	6.3(1980)	6.3(0)
COLUMBUS & SOUTHERN OHIO ELEC	CAPACITY FACTOR, %	48	65	65
CONESVILLE 6	DIRECT CAPITAL, $	20663500.	29391150.	29391150.
NEW 411MW (GROSS)	INDIRECT CAPITAL, $	**********	8082550.	8082550.
STARTUP 6/78 411MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	50.3(1975)	91.2(1980)	91.2(1980)
4.67 %S BITUMINOUS	DIRECT ANNUAL, $	4724280.	6474800.	6474800.
LIME	OVERHEAD COST, $	443800.	517450.	517450.
AIR CORRECTION DIVISION, UOP	FIXED CHARGES, $	**********	6365350.	6494200.
ENERGY CONSUMPTION: 3.9%	TOTAL ANNUAL, MILLS/KWH(YEAR)	5.5(1978)	6.3(1980)	6.3(1980)
COMMONWEALTH EDISON	CAPACITY FACTOR, %	***	65	65
POWERTON 51	DIRECT CAPITAL, $	56250000.	**********	**********
RETROFIT 450MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 4/80 450MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	125.0(1979)	******(0)	******(0)
3.53 %S	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
AIR CORRECTION DIVISION, UOP	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 5.6%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST REPORTED	 ADJUSTED	 STANDARDIZED ADJUSTED
DUQUESNE LIGHT	CAPACITY FACTOR, %	69	65	65
ELRAMA 1-4	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 510MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 10/75 510MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	120.2(1976)	172.3(1980)	172.3(1980)
2.20 %S	DIRECT ANNUAL, $	13441451.	12429100.	12429100.
LIME	OVERHEAD COST, $	**********	4149100.	4149100.
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	16338300.	15224300.
ENERGY CONSUMPTION: 3.5%	TOTAL ANNUAL, MILLS/KWH(YEAR)	7.2(1979)	11.9(1980)	11.5(1980)
DUQUESNE LIGHT	CAPACITY FACTOR, %	55	65	65
PHILLIPS 1-6	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 408MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 7/73 408MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	127.0(1972)	192.7(1980)	192.7(1980)
1.92 %S BITUMINOUS	DIRECT ANNUAL, $	11886000.	12303100.	12303100.
LIME	OVERHEAD COST, $	**********	4035600.	4035600.
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	14687000.	13689300.
ENERGY CONSUMPTION: 3.4%	TOTAL ANNUAL, MILLS/KWH(YEAR)	11.3(1979)	16.3(1980)	15.7(1980)
INDIANAPOLIS POWER & LIGHT	CAPACITY FACTOR, %	***	65	65
PETERSBURG 3	DIRECT CAPITAL, $	**********	**********	**********
NEW 532MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 12/77 532MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	104.9(1976)	148.7(1980)	148.7(1980)
3.25 %S BITUMINOUS	DIRECT ANNUAL, $	**********	12025700.	12025700.
LIMESTONE	OVERHEAD COST, $	**********	3072600.	3072600.
AIR CORRECTION DIVISION, UOP	FIXED CHARGES, $	**********	11177300.	13708600.
ENERGY CONSUMPTION: 2.4%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	9.0(1980)	9.8(1980)
KANSAS CITY POWER & LIGHT	CAPACITY FACTOR, %	35	65	65
HAWTHORN 3	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 90MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 11/72 90MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	29.4(1972)	57.5(1980)	57.5(1980)
.60 %S BITUMINOUS	DIRECT ANNUAL, $	346441.	1308900.	1308900.
LIME	OVERHEAD COST, $	**********	266750.	266750.
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	1036800.	1096900.
ENERGY CONSUMPTION: 2.2%	TOTAL ANNUAL, MILLS/KWH(YEAR)	1.1(1978)	4.7(1980)	4.8(1980)
KANSAS CITY POWER & LIGHT	CAPACITY FACTOR, %	35	65	65
HAWTHORN 4	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 90MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 8/72 90MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	29.4(1972)	57.5(1980)	57.5(1980)
.60 %S BITUMINOUS	DIRECT ANNUAL, $	346441.	1308900.	1308900.
LIME	OVERHEAD COST, $	**********	266750.	266750.
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	1036800.	1096900.
ENERGY CONSUMPTION: 2.2%	TOTAL ANNUAL, MILLS/KWH(YEAR)	1.1(1978)	4.7(1980)	4.8(1980)
KANSAS CITY POWER & LIGHT	CAPACITY FACTOR, %	21	65	65
LA CYGNE 1	DIRECT CAPITAL, $	**********	78594900.	78594900.
NEW 820MW (GROSS)	INDIRECT CAPITAL, $	**********	1684200.	1684200.
STARTUP 2/73 820MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	53.7(1972)	91.9(1980)	91.9(1980)
5.39 %S SUBBITUMINOUS	DIRECT ANNUAL, $	8060047.	26257300.	26257300.
LIMESTONE	OVERHEAD COST, $	**********	8569500.	8569500.
BABCOCK & WILCOX	FIXED CHARGES, $	**********	13912400.	13912400.
ENERGY CONSUMPTION: 2.9%	TOTAL ANNUAL, MILLS/KWH(YEAR)	5.4(1979)	10.4(1980)	10.4(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST		
		REPORTED	ADJUSTED	STANDARDIZED ADJUSTED
KANSAS POWER & LIGHT	CAPACITY FACTOR, %	50	65	65
JEFFREY 1	DIRECT CAPITAL, $	25530000.	**********	**********
NEW 720MW (GROSS)	INDIRECT CAPITAL, $	1776900.	**********	**********
STARTUP 8/78 540MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	37.9(1978)	50.2(1980)	50.2(1980)
.32 %S	DIRECT ANNUAL, $	321000.	2146400.	2146400.
LIMESTONE	OVERHEAD COST, $	**********	112300.	112300.
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	6269700.	6269700.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.1(1978)	2.2(1980)	2.2(1980)
KANSAS POWER & LIGHT	CAPACITY FACTOR, %	***	65	65
JEFFREY 2	DIRECT CAPITAL, $	20741000.	**********	**********
NEW 700MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 1/80 490MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	29.6(0)	******(0)	******(0)
.30 %S	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
KENTUCKY UTILITIES	CAPACITY FACTOR, %	13	65	65
GREEN RIVER 1-3	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 64MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 9/75 64MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	62.0(1975)	108.1(1980)	108.1(1980)
4.00 %S BITUMINOUS	DIRECT ANNUAL, $	364005.	1864100.	1864100.
LIME	OVERHEAD COST, $	**********	400300.	400300.
AMERICAN AIR FILTER	FIXED CHARGES, $	**********	1203500.	1198700.
ENERGY CONSUMPTION: 3.1%	TOTAL ANNUAL, MILLS/KWH(YEAR)	5.2(1978)	10.1(1980)	10.1(1980)
LOUISVILLE GAS & ELECTRIC	CAPACITY FACTOR, %	47	65	65
CANE RUN 4	DIRECT CAPITAL, $	10847000.	16791100.	16791100.
RETROFIT 188MW (GROSS)	INDIRECT CAPITAL, $	1800000.	3282700.	3282700.
STARTUP 8/76 188MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	66.6(1975)	105.7(1980)	105.7(1980)
3.75 %S BITUMINOUS	DIRECT ANNUAL, $	960301.	2174900.	2174900.
LIME	OVERHEAD COST, $	**********	346300.	346300.
AMERICAN AIR FILTER	FIXED CHARGES, $	**********	2926800.	3478800.
ENERGY CONSUMPTION: 1.6%	TOTAL ANNUAL, MILLS/KWH(YEAR)	1.3(1978)	5.3(1980)	5.8(1980)
LOUISVILLE GAS & ELECTRIC	CAPACITY FACTOR, %	50	65	65
CANE RUN 5	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 200MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 12/77 200MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	68.8(1977)	93.9(1980)	93.9(1980)
3.75 %S BITUMINOUS	DIRECT ANNUAL, $	763443.	1887300.	1887300.
LIME	OVERHEAD COST, $	**********	262400.	262400.
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	3164900.	3255100.
ENERGY CONSUMPTION: 1.5%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.9(1978)	4.9(1980)	5.0(1980)
LOUISVILLE GAS & ELECTRIC	CAPACITY FACTOR, %	***	65	65
CANE RUN 6	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 299MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 4/79 299MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	71.5(1978)	80.6(1980)	80.6(1980)
4.80 %S BITUMINOUS	DIRECT ANNUAL, $	**********	3986300.	3986300.
DUAL ALKALI	OVERHEAD COST, $	**********	819600.	819600.
THYSSEN/CEA	FIXED CHARGES, $	**********	4327600.	4021300.
ENERGY CONSUMPTION: 1.0%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	6.0(1980)	5.8(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

		COST		
UNIT DESCRIPTION	COST DESCRIPTION	REPORTED	ADJUSTED	STANDARDIZED ADJUSTED
LOUISVILLE GAS & ELECTRIC	CAPACITY FACTOR, %	70	65	65
MILL CREEK 3	DIRECT CAPITAL, $	**********	**********	**********
NEW 42[illegible]MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 8/78 42[illegible]MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	42.6(1977)	60.5(1980)	60.5(1980)
3.75 %S BITUMINOUS	DIRECT ANNUAL, $	321463.	3990500.	3990500.
LIME	OVERHEAD COST, $	**********	229000.	229000.
AMERICAN AIR FILTER	FIXED CHARGES, $	**********	4636000.	4636000.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	1.3(1978)	3.7(1980)	3.7(1980)
LOUISVILLE GAS & ELECTRIC	CAPACITY FACTOR, %	***	65	65
PADDY'S RUN 6	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 72MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 4/73 72MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	61.7(1973)	122.0(1980)	122.0(1980)
2.50 %S BITUMINOUS	DIRECT ANNUAL, $	**********	2032400.	2032400.
LIME	OVERHEAD COST, $	**********	518200.	518200.
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	1528700.	1480000.
ENERGY CONSUMPTION: 2.8%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	11.3(1980)	11.1(1980)
MINNKOTA POWER	CAPACITY FACTOR, %	40	65	65
MILTON R. YOUNG 2	DIRECT CAPITAL, $	30066200.	**********	**********
NEW 440MW (GROSS)	INDIRECT CAPITAL, $	14052400.	**********	**********
STARTUP 9/77 185MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	100.3(1976)	142.9(1980)	142.9(1980)
.70 %S LIGNITE	DIRECT ANNUAL, $	754445.	2276400.	2276400.
LIME/ALKALINE FLYASH	OVERHEAD COST, $	**********	570900.	570900.
THYSSEN/CEA	FIXED CHARGES, $	**********	10895800.	10895800.
ENERGY CONSUMPTION: 1.6%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.5(1978)	5.7(1980)	5.7(1980)
MONONGAHELA POWER	CAPACITY FACTOR, %	65	65	65
PLEASANTS 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 618MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 3/79 618MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	106.3(1978)	113.4(1980)	113.4(1980)
3.00 %S BITUMINOUS	DIRECT ANNUAL, $	9015879.	11339000.	11339000.
LIME	OVERHEAD COST, $	**********	2668200.	2668200.
BABCOCK & WILCOX	FIXED CHARGES, $	**********	12141100.	12141100.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	2.7(1979)	7.9(1980)	7.9(1980)
MONONGAHELA POWER	CAPACITY FACTOR, %	***	65	65
PLEASANTS 2	DIRECT CAPITAL, $	66437500.	**********	**********
NEW 618MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 10/80 618MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	106.3(0)	******(0)	******(0)
3.00 %S BITUMINOUS	DIRECT ANNUAL, $	10104003.	**********	**********
LIME	OVERHEAD COST, $	**********	**********	**********
BABCOCK & WILCOX	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	2.7(7800)	******(0)	******(0)
MONTANA POWER	CAPACITY FACTOR, %	71	65	65
COLSTRIP 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 360MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 9/75 360MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	101.4(1975)	133.8(1980)	133.8(1980)
.77 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	4876100.	4876100.
LIME/ALKALINE FLYASH	OVERHEAD COST, $	**********	1172200.	1172200.
THYSSEN/CEA	FIXED CHARGES, $	**********	8350200.	8350200.
ENERGY CONSUMPTION: 3.3%	TOTAL ANNUAL, MILLS/KWH(YEAR)	3.0(1979)	7.6(1980)	7.6(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

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COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST REPORTED	COST ADJUSTED	COST STANDARDIZED ADJUSTED
MONTANA POWER	CAPACITY FACTOR, %	71	65	65
COLSTRIP 2	DIRECT CAPITAL, $	**********	**********	**********
NEW 360MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 5/76 360MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	101.4(1975)	133.8(1980)	133.8(1980)
.77 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	4876100.	4876100.
LIME/ALKALINE FLYASH	OVERHEAD COST, $	**********	1172200.	1172200.
THYSSEN/CEA	FIXED CHARGES, $	**********	8350200.	8350200.
ENERGY CONSUMPTION: 3.3%	TOTAL ANNUAL, MILLS/KWH(YEAR)	3.0(1979)	7.6(1980)	7.6(1980)
NEVADA POWER	CAPACITY FACTOR, %	56	65	65
REID GARDNER 1	DIRECT CAPITAL, $	2681660.	**********	**********
RETROFIT 125MW (GROSS)	INDIRECT CAPITAL, $	2681715.	**********	**********
STARTUP 3/74 125MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	42.9(1973)	79.9(1980)	79.9(1980)
.50 %S BITUMINOUS	DIRECT ANNUAL, $	251514.	1359650.	1359650.
SODIUM CARBONATE	OVERHEAD COST, $	**********	91400.	91400.
THYSSEN/CEA	FIXED CHARGES, $	**********	1863700.	1731787.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.5(1978)	5.3(1980)	5.1(1980)
NEVADA POWER	CAPACITY FACTOR, %	56	65	65
REID GARDNER 2	DIRECT CAPITAL, $	2681660.	**********	**********
RETROFIT 125MW (GROSS)	INDIRECT CAPITAL, $	2681715.	**********	**********
STARTUP 4/74 125MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	42.9(1973)	79.9(1980)	79.9(1980)
.50 %S BITUMINOUS	DIRECT ANNUAL, $	251514.	1359650.	1359650.
SODIUM CARBONATE	OVERHEAD COST, $	**********	91400.	91400.
THYSSEN/CEA	FIXED CHARGES, $	**********	1863700.	1731787.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.5(1978)	5.3(1980)	5.1(1980)
NEVADA POWER	CAPACITY FACTOR, %	59	65	65
REID GARDNER 3	DIRECT CAPITAL, $	**********	**********	**********
NEW 125MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 6/76 125MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	100.8(1975)	138.5(1980)	138.5(1980)
.50 %S BITUMINOUS	DIRECT ANNUAL, $	131824.	1201100.	1201100.
SODIUM CARBONATE	OVERHEAD COST, $	**********	46900.	46900.
THYSSEN/CEA	FIXED CHARGES, $	**********	2999300.	2999300.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.2(1978)	6.8(1980)	6.8(1980)
NORTHERN INDIANA PUB SERVICE	CAPACITY FACTOR, %	23	65	65
DEAN H. MITCHELL 11	DIRECT CAPITAL, $	11951830.	**********	**********
RETROFIT 116MW (GROSS)	INDIRECT CAPITAL, $	6240210.	**********	**********
STARTUP 7/76 115MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	157.4(1976)	233.6(1980)	233.6(1980)
3.50 %S	DIRECT ANNUAL, $	665890.	1419600.	1419600.
WELLMAN LORD	OVERHEAD COST, $	**********	647200.	647200.
DAVY MCKEE	FIXED CHARGES, $	**********	7924500.	4679100.
ENERGY CONSUMPTION: 12.1%	TOTAL ANNUAL, MILLS/KWH(YEAR)	13.0(1978)	18.7(1980)	12.6(1980)
NORTHERN STATES POWER	CAPACITY FACTOR, %	61	65	65
SHERBURNE 1	DIRECT CAPITAL, $	34982020.	47549700.	47549700.
NEW 740MW (GROSS)	INDIRECT CAPITAL, $	**********	20446350.	20446350.
STARTUP 3/76 740MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	49.3(1972)	94.4(1980)	94.4(1980)
.80 %S SUBBITUMINOUS	DIRECT ANNUAL, $	2716759.	6236720.	6236720.
LIMESTONE/ALKALINE FLYASH	OVERHEAD COST, $	**********	1318400.	1318400.
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	11783700.	11783700.
ENERGY CONSUMPTION: 2.7%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.8(1978)	5.0(1980)	5.0(1980)

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SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST REPORTED	 ADJUSTED	 STANDARDIZED ADJUSTED
NORTHERN STATES POWER	CAPACITY FACTOR, %	61	65	65
SHERBURNE 2	DIRECT CAPITAL, $	34982020.	47549700.	47549700.
NEW 740MW (GROSS)	INDIRECT CAPITAL, $	**********	20446350.	20446350.
STARTUP 3/77 740MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	49.3(1972)	94.4(1980)	94.4(1980)
.80 %S SUBBITUMINOUS	DIRECT ANNUAL, $	2716759.	6236720.	6236720.
LIMESTONE/ALKALINE FLYASH	OVERHEAD COST, $	**********	1318400.	1318400.
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	11783700.	11783700.
ENERGY CONSUMPTION: 2.7%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.8(1978)	5.0(1980)	5.0(1980)
PACIFIC POWER & LIGHT	CAPACITY FACTOR, %	***	65	65
JIM BRIDGER 4	DIRECT CAPITAL, $	**********	**********	**********
NEW 550MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 9/79 550MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	90.3(1974)	108.6(1980)	108.6(1980)
.56 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	5842700.	5842700.
SODIUM CARBONATE	OVERHEAD COST, $	**********	1659800.	1659800.
AIR CORRECTION DIVISION, UOP	FIXED CHARGES, $	**********	10351600.	10351600.
ENERGY CONSUMPTION: .2%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	6.2(1980)	6.2(1980)
PENNSYLVANIA POWER	CAPACITY FACTOR, %	42	65	65
BRUCE MANSFIELD 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 917MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 12/75 917MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	120.7(1975)	132.3(1980)	132.3(1980)
3.00 %S BITUMINOUS	DIRECT ANNUAL, $	9979900.	25909050.	25909050.
LIME	OVERHEAD COST, $	**********	3656850.	3656850.
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	21228600.	21022390.
ENERGY CONSUMPTION: 6.0%	TOTAL ANNUAL, MILLS/KWH(YEAR)	3.3(1978)	10.8(1980)	10.8(1980)
PENNSYLVANIA POWER	CAPACITY FACTOR, %	42	65	65
BRUCE MANSFIELD 2	DIRECT CAPITAL, $	**********	**********	**********
NEW 917MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 7/77 917MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	120.6(1975)	132.3(1980)	132.3(1980)
3.00 %S BITUMINOUS	DIRECT ANNUAL, $	9979900.	25909050.	25909050.
LIME	OVERHEAD COST, $	**********	3656850.	3656850.
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	21228600.	21022390.
ENERGY CONSUMPTION: 6.0%	TOTAL ANNUAL, MILLS/KWH(YEAR)	3.3(1978)	10.8(1980)	10.8(1980)
PENNSYLVANIA POWER	CAPACITY FACTOR, %	***	65	65
BRUCE MANSFIELD 3	DIRECT CAPITAL, $	**********	**********	**********
NEW 917MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 6/80 917MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	243.0(1979)	******(0)	******(0)
3.00 %S	DIRECT ANNUAL, $	**********	**********	**********
LIME	OVERHEAD COST, $	**********	**********	**********
PULLMAN KELLOGG	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
PUBLIC SERVICE OF NEW MEXICO	CAPACITY FACTOR, %	***	65	65
SAN JUAN 1	DIRECT CAPITAL, $	**********	64359600.	64359600.
RETROFIT 361MW (GROSS)	INDIRECT CAPITAL, $	**********	27674600.	27674600.
STARTUP 4/78 361MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	132.8(1977)	254.9(1980)	254.9(1980)
.80 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	7660000.	7660000.
WELLMAN LORD	OVERHEAD COST, $	**********	2402700.	2402700.
DAVY MCKEE	FIXED CHARGES, $	**********	17164400.	15949530.
ENERGY CONSUMPTION: 4.4%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	15.2(1980)	14.5(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST REPORTED	 ADJUSTED	 STANDARDIZED ADJUSTED
PUBLIC SERVICE OF NEW MEXICO	CAPACITY FACTOR, %	***	65	65
SAN JUAN 2	DIRECT CAPITAL, $	**********	63362300.	63362300.
RETROFIT 350MW (GROSS)	INDIRECT CAPITAL, $	**********	27245800.	27245800.
STARTUP 8/78 350MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	137.1(1977)	258.9(1980)	258.9(1980)
.80 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	7584600.	7584600.
WELLMAN LORD	OVERHEAD COST, $	**********	2369900.	2369900.
DAVY MCKEE	FIXED CHARGES, $	**********	16898400.	15702400.
ENERGY CONSUMPTION: 4.6%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	15.4(1980)	14.7(1980)
PUBLIC SERVICE OF NEW MEXICO	CAPACITY FACTOR, %	***	65	65
SAN JUAN 3	DIRECT CAPITAL, $	98790000.	**********	**********
NEW 534MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 12/79 534MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	185.0(1978)	******(0)	******(0)
.80 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
WELLMAN LORD	OVERHEAD COST, $	**********	**********	**********
DAVY MCKEE	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 3.6%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
SALT RIVER PROJECT	CAPACITY FACTOR, %	***	65	65
CORONADO 1	DIRECT CAPITAL, $	25900000.	**********	**********
NEW 350MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 11/79 280MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	74.0(1978)	******(0)	******(0)
.50 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
PULLMAN KELLOGG	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 4.3%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
SALT RIVER PROJECT	CAPACITY FACTOR, %	***	65	65
CORONADO 2	DIRECT CAPITAL, $	25900000.	**********	**********
NEW 350MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 7/80 280MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	74.0(1978)	******(0)	******(0)
.50 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
PULLMAN KELLOGG	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 4.3%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
SOUTH CAROLINA PUBLIC SERVICE	CAPACITY FACTOR, %	80	65	65
WINYAH 2	DIRECT CAPITAL, $	6026098.	9463800.	9463800.
NEW 280MW (GROSS)	INDIRECT CAPITAL, $	520000.	2452300.	2452300.
STARTUP 7/77 140MW (ESC)	OTHER CAPITAL, $	100000.	144000.	144000.
COAL	TOTAL CAPITAL, $/KW(YEAR)	23.7(1976)	43.1(1980)	43.1(1980)
1.10 %S BITUMINOUS	DIRECT ANNUAL, $	527000.	552000.	552000.
LIMESTONE	OVERHEAD COST, $	**********	135700.	135700.
BABCOCK & WILCOX	FIXED CHARGES, $	**********	1788500.	2090000.
ENERGY CONSUMPTION: 1.1%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.3(1978)	1.7(1980)	1.9(1980)
SOUTH MISSISSIPPI ELEC PWR	CAPACITY FACTOR, %	***	65	65
R.D. MORROW, SR. 1	DIRECT CAPITAL, $	10250000.	17176000.	17176000.
NEW 200MW (GROSS)	INDIRECT CAPITAL, $	646000.	4880750.	4880750.
STARTUP 8/78 124MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	53.7(1975)	108.7(1980)	108.7(1980)
1.30 %S BITUMINOUS	DIRECT ANNUAL, $	**********	3194750.	3194750.
LIMESTONE	OVERHEAD COST, $	**********	650250.	650250.
ENVIRONEERING, RILEY STOKER	FIXED CHARGES, $	**********	2668850.	3822400.
ENERGY CONSUMPTION: 5.5%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	6.4(1980)	7.5(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST: REPORTED	COST: ADJUSTED	COST: STANDARDIZED ADJUSTED
SOUTH MISSISSIPPI ELEC PWR	CAPACITY FACTOR, %	***	65	65
R.D. MORROW, SR. 2	DIRECT CAPITAL, $	10250000.	17176000.	17176000.
NEW 200MW (GROSS)	INDIRECT CAPITAL, $	646000.	4880750.	4880750.
STARTUP 6/79 124MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	53.7(1975)	108.7(1980)	108.7(1980)
1.30 %S BITUMINOUS	DIRECT ANNUAL, $	**********	3194750.	3194750.
LIMESTONE	OVERHEAD COST, $	**********	650250.	650250.
ENVIRONEERING, RILEY STOKER	FIXED CHARGES, $	**********	2668850.	3822400.
ENERGY CONSUMPTION: 5.5%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	6.4(1980)	7.5(1980)
SOUTHERN ILLINOIS POWER	CAPACITY FACTOR, %	63	65	65
MARION 4	DIRECT CAPITAL, $	**********	**********	**********
NEW 173MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 5/79 173MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL/REFUS	TOTAL CAPITAL, $/KW(YEAR)	87.9(1977)	110.9(1980)	110.9(1980)
3.75 %S BITUMINOUS	DIRECT ANNUAL, $	859453.	2475100.	2475000.
LIMESTONE	OVERHEAD COST, $	**********	727000.	727000.
BABCOCK & WILCOX	FIXED CHARGES, $	**********	3323500.	3323500.
ENERGY CONSUMPTION: 2.3%	TOTAL ANNUAL, MILLS/KWH(YEAR)	1.0(1978)	7.1(1980)	7.1(1980)
SOUTHERN INDIANA GAS & ELEC	CAPACITY FACTOR, %	65	65	65
A.B. BROWN 1	DIRECT CAPITAL, $	12495000.	15019500.	15019500.
NEW 265MW (GROSS)	INDIRECT CAPITAL, $	**********	6458400.	6458400.
STARTUP 3/79 265MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	47.2(1978)	81.0(1980)	81.0(1980)
3.35 %S BITUMINOUS	DIRECT ANNUAL, $	1850565.	2530300.	2530300.
DUAL ALKALI	OVERHEAD COST, $	**********	282200.	282200.
FMC	FIXED CHARGES, $	**********	3722100.	3722100.
ENERGY CONSUMPTION: .8%	TOTAL ANNUAL, MILLS/KWH(YEAR)	1.3(1978)	4.6(1980)	4.6(1980)
SPRINGFIELD CITY UTILITIES	CAPACITY FACTOR, %	43	65	65
SOUTHWEST 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 194MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 4/77 194MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	86.3(1974)	133.5(1980)	133.5(1980)
3.50 %S BITUMINOUS	DIRECT ANNUAL, $	778749.	2535700.	2535700.
LIMESTONE	OVERHEAD COST, $	**********	465000.	465000.
AIR CORRECTION DIVISION, UOP	FIXED CHARGES, $	**********	4489300.	4489300.
ENERGY CONSUMPTION: 4.6%	TOTAL ANNUAL, MILLS/KWH(YEAR)	1.2(1979)	7.6(1980)	7.6(1980)
TENNESSEE VALLEY AUTHORITY	CAPACITY FACTOR, %	***	65	65
WIDOWS CREEK 7	DIRECT CAPITAL, $	25875000.	**********	**********
RETROFIT 575MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 3/81 575MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	45.0(0)	******(0)	******(0)
3.70 %S BITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
COMBUSTION ENGINEERING	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
TENNESSEE VALLEY AUTHORITY	CAPACITY FACTOR, %	41	65	65
WIDOWS CREEK 8	DIRECT CAPITAL, $	**********	72269300.	72269300.
RETROFIT 550MW (GROSS)	INDIRECT CAPITAL, $	**********	7516000.	7516000.
STARTUP 5/77 550MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	87.1(1976)	145.1(1980)	145.1(1980)
3.70 %S BITUMINOUS	DIRECT ANNUAL, $	**********	4692000.	4692000.
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
TENNESSEE VALLEY AUTHORITY	FIXED CHARGES, $	**********	14880000.	13826800.
ENERGY CONSUMPTION: 4.7%	TOTAL ANNUAL, MILLS/KWH(YEAR)	7.8(1978)	6.7(1980)	6.3(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-1
COSTS FOR OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST		
		REPORTED	ADJUSTED	STANDARDIZED ADJUSTED
TEXAS UTILITIES	CAPACITY FACTOR, %	***	65	65
MONTICELLO 3	DIRECT CAPITAL, $	**********	**********	**********
NEW 800MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 5/78 800MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	25.0(1978)	******(0)	******(0)
1.50 %S LIGNITE	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
UTAH POWER & LIGHT	CAPACITY FACTOR, %	***	65	65
HUNTER 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 400MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 5/79 360MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	56.7(1978)	68.9(1980)	68.9(1980)
.55 %S BITUMINOUS	DIRECT ANNUAL, $	**********	3639200.	3639200.
LIME	OVERHEAD COST, $	**********	966900.	966900.
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	5134000.	5134000.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(1978)	4.3(1980)	4.3(1980)
UTAH POWER & LIGHT	CAPACITY FACTOR, %	***	65	65
HUNTER 2	DIRECT CAPITAL, $	24400000.	**********	**********
NEW 400MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 6/80 360MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	61.0(0)	******(0)	******(0)
.55 %S	DIRECT ANNUAL, $	**********	**********	**********
LIME	OVERHEAD COST, $	**********	**********	**********
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
UTAH POWER & LIGHT	CAPACITY FACTOR, %	80	65	65
HUNTINGTON 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 430MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 5/78 366MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	63.0(1977)	82.6(1980)	82.6(1980)
.55 %S BITUMINOUS	DIRECT ANNUAL, $	2946400.	4648300.	4648300.
LIME	OVERHEAD COST, $	**********	1517100.	1517100.
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	6151800.	6151800.
ENERGY CONSUMPTION: 1.6%	TOTAL ANNUAL, MILLS/KWH(YEAR)	1.3(1978)	5.4(1980)	5.4(1980)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-2
COSTS FOR NON-OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST REPORTED	 ADJUSTED	 STANDARDIZED ADJUSTED
BASIN ELECTRIC POWER	CAPACITY FACTOR, %	75	65	65
ANTELOPE VALLEY 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 440MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 10/83 440MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	75.2(1981)	******(0)	******(0)
.68 %S LIGNITE	DIRECT ANNUAL, $	**********	**********	**********
LIME/SPRAY DRYING	OVERHEAD COST, $	**********	**********	**********
JOY MFG/NIRO ATOMIZER	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.8(1981)	******(0)	******(0)
BASIN ELECTRIC POWER	CAPACITY FACTOR, %	***	65	65
ANTELOPE VALLEY 2	DIRECT CAPITAL, $	47960000.	**********	**********
NEW 440MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 10/85 440MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	109.0(0)	******(0)	******(0)
.68 %S LIGNITE	DIRECT ANNUAL, $	1797596.	**********	**********
LIME/SPRAY DRYING	OVERHEAD COST, $	**********	**********	**********
JOY MFG/NIRO ATOMIZER	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.8(7800)	******(0)	******(0)
BASIN ELECTRIC POWER	CAPACITY FACTOR, %	75	65	65
LARAMIE RIVER 3	DIRECT CAPITAL, $	**********	**********	**********
NEW 570MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 11/82 570MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	83.0(1981)	******(0)	******(0)
.54 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIME/SPRAY DRYING	OVERHEAD COST, $	**********	**********	**********
BABCOCK & WILCOX	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	.6(1981)	******(0)	******(0)
BOSTON EDISON	CAPACITY FACTOR, %	***	65	65
MYSTIC 6	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 150MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 4/72 150MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
OIL	TOTAL CAPITAL, $/KW(YEAR)	63.4(1972)	******(0)	******(0)
2.00 %S NO. 6	DIRECT ANNUAL, $	**********	**********	**********
MAGNESIUM OXIDE	OVERHEAD COST, $	**********	**********	**********
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	3.0(1974)	******(0)	******(0)
COMMONWEALTH EDISON	CAPACITY FACTOR, %	49	65	65
WILL COUNTY 1A	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 167MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 2/72 167MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	113.0(1972)	******(0)	******(0)
1.50 %S	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
BABCOCK & WILCOX	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 4.2%	TOTAL ANNUAL, MILLS/KWH(YEAR)	13.1(1975)	******(0)	******(0)
DETROIT EDISON	CAPACITY FACTOR, %	***	65	65
ST. CLAIR 6A	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 325MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 6/75 163MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	80.3(1976)	******(0)	******(0)
.35 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
PEABODY PROCESS SYSTEMS	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 2.8%	TOTAL ANNUAL, MILLS/KWH(YEAR)	9.6(1976)	******(0)	******(0)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-2
COSTS FOR NON-OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION		COST DESCRIPTION	COST REPORTED	COST ADJUSTED	COST STANDARDIZED ADJUSTED
HOOSIER ENERGY		CAPACITY FACTOR, %	***	65	65
MEROM 1		DIRECT CAPITAL, $	24500000.	**********	**********
NEW	490MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 5/82	441MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL		TOTAL CAPITAL, $/KW(YEAR)	50.0(0)	******(0)	******(0)
3.50 %S		DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE		OVERHEAD COST, $	**********	**********	**********
MITSUBISHI HEAVY INDUSTRIES		FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%		TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
HOOSIER ENERGY		CAPACITY FACTOR, %	***	65	65
MEROM 2		DIRECT CAPITAL, $	24500000.	**********	**********
NEW	490MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 11/81	441MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL		TOTAL CAPITAL, $/KW(YEAR)	50.0(0)	******(0)	******(0)
3.50 %S		DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE		OVERHEAD COST, $	**********	**********	**********
MITSUBISHI HEAVY INDUSTRIES		FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%		TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
ILLINOIS POWER COMPANY		CAPACITY FACTOR, %	***	65	65
WOOD RIVER 4		DIRECT CAPITAL, $	**********	**********	**********
RETROFIT	110MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 9/72	110MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL		TOTAL CAPITAL, $/KW(YEAR)	82.5(1972)	******(0)	******(0)
3.10 %S		DIRECT ANNUAL, $	**********	**********	**********
CATALYTIC OXIDATION		OVERHEAD COST, $	**********	**********	**********
MONSANTO ENVIRO CHEM SYSTEMS		FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%		TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
LAKELAND UTILITIES		CAPACITY FACTOR, %	***	65	65
MCINTOSH 3		DIRECT CAPITAL, $	11775400.	**********	**********
NEW	364MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 1/82	364MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL		TOTAL CAPITAL, $/KW(YEAR)	32.4(0)	******(0)	******(0)
2.56 %S BITUMINOUS		DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE		OVERHEAD COST, $	**********	**********	**********
BABCOCK & WILCOX		FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%		TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
MONTANA POWER		CAPACITY FACTOR, %	***	65	65
COLSTRIP 3		DIRECT CAPITAL, $	76643000.	**********	**********
NEW	700MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 10/83	700MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL		TOTAL CAPITAL, $/KW(YEAR)	109.5(0)	******(0)	******(0)
.70 %S		DIRECT ANNUAL, $	**********	**********	**********
LIME/ALKALINE FLYASH		OVERHEAD COST, $	**********	**********	**********
THYSSEN/CEA		FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%		TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
MONTANA POWER		CAPACITY FACTOR, %	***	65	65
COLSTRIP 4		DIRECT CAPITAL, $	70686000.	**********	**********
NEW	700MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 0/84	700MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL		TOTAL CAPITAL, $/KW(YEAR)	101.0(0)	******(0)	******(0)
.70 %S		DIRECT ANNUAL, $	**********	**********	**********
LIME/ALKALINE FLYASH		OVERHEAD COST, $	**********	**********	**********
THYSSEN/CEA		FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%		TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)

****** INDICATES COST FIGURES NOT YET AVAILABLE

SECTION A-2
COSTS FOR NON-OPERATIONAL FGD SYSTEMS

UNIT DESCRIPTION	COST DESCRIPTION	COST REPORTED	 ADJUSTED	 STANDARDIZED ADJUSTED
PHILADELPHIA ELECTRIC	CAPACITY FACTOR, %	65	65	65
EDDYSTONE 1A	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 120MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 9/75 120MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	285.7(1973)	187.1(1980)	187.1(1980)
2.60 %S BITUMINOUS	DIRECT ANNUAL, $	**********	2527900.	2527900.
MAGNESIUM OXIDE	OVERHEAD COST, $	**********	**********	**********
UNITED ENGINEERS	FIXED CHARGES, $	**********	3768500.	3501800.
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	6.4(1979)	10.5(1980)	10.1(1980)
PUBLIC SERVICE OF COLORADO	CAPACITY FACTOR, %	***	65	65
VALMONT 5A	DIRECT CAPITAL, $	**********	**********	**********
RETROFIT 166MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 10/74 166MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	87.0(1974)	******(0)	******(0)
.70 %S SUBBITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE/ALKALINE FLYASH	OVERHEAD COST, $	**********	**********	**********
UOP/PUBLIC SERVICE OF COLORADO	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: 3.6%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
SOUTH CAROLINA PUBLIC SERVICE	CAPACITY FACTOR, %	***	65	65
CROSS 1	DIRECT CAPITAL, $	**********	**********	**********
NEW 500MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 5/88 500MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	40.0(0)	******(0)	******(0)
1.80 %S BITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
PEABODY PROCESS SYSTEMS	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
SOUTH CAROLINA PUBLIC SERVICE	CAPACITY FACTOR, %	***	65	65
CROSS 2	DIRECT CAPITAL, $	**********	**********	**********
NEW 500MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 11/83 500MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	40.0(0)	******(0)	******(0)
1.80 %S BITUMINOUS	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
PEABODY PROCESS SYSTEMS	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
TENNESSEE VALLEY AUTHORITY	CAPACITY FACTOR, %	***	65	65
PARADISE 1	DIRECT CAPITAL, $	52500000.	**********	**********
RETROFIT 704MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 3/82 704MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	74.6(0)	******(0)	******(0)
4.20 %S	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)
TENNESSEE VALLEY AUTHORITY	CAPACITY FACTOR, %	***	65	65
PARADISE 2	DIRECT CAPITAL, $	52500000.	**********	**********
RETROFIT 704MW (GROSS)	INDIRECT CAPITAL, $	**********	**********	**********
STARTUP 6/82 704MW (ESC)	OTHER CAPITAL, $	**********	**********	**********
COAL	TOTAL CAPITAL, $/KW(YEAR)	74.6(0)	******(0)	******(0)
4.20 %S	DIRECT ANNUAL, $	**********	**********	**********
LIMESTONE	OVERHEAD COST, $	**********	**********	**********
GE ENVIRONMENTAL SERVICES	FIXED CHARGES, $	**********	**********	**********
ENERGY CONSUMPTION: ****%	TOTAL ANNUAL, MILLS/KWH(YEAR)	******(0)	******(0)	******(0)

****** INDICATES COST FIGURES NOT YET AVAILABLE

APPENDIX B

DEFINITIONS

DEFINITIONS

Boiler Commercial Service Date	Date when boiler and auxiliary equipment (including FGD system for new boilers) has met initial supplier guarantees and begins to contribute electrical power to the power grid.
Byproduct Nature	The nature (e.g. elemental sulfur, sulfuric acid) and disposition (e.g. stockpile on site, marketed) of the end product by systems that generate a saleable product.
Commercial Service Date (FGD System)	Date when the FGD system successfully completes compliance testing and the utility is satisfied that the system meets supplier contractual guarantees.
Company Name	Name of corporation as it appears in Electrical World - Directory of Electrical Utilities, McGraw-Hill - Current Edition - as space permits.
Disposal	Disposal method for throwaway product systems producing sludge including: interim and final disposal sites and disposal type (minefill, landfill, etc.) as well as disposal location and site capacity.
Efficiency:	
Total Unit Design Particle Removal Efficiency	The actual percentage of particulate matter removed by the emission control system (mechanical collectors, ESP, or fabric filter and FGD) from the untreated flue gas.
Total Unit SO_2 Design Removal Efficiency	The actual percentage of SO_2 removed from the flue gas by the FGD system.

FGD Viability Indexes

Several parameters have been developed to quantify the viability of FGD system technology. Various terms such as "availability," "reliability," "operability," and "utilization" are used to accurately represent the operation of any FGD system during a given period. The above-mentioned parameters are defined below and discussed briefly. The objectives of this discussion are to make the reader aware that several different definitions are being used and to select appropriate parameters that can be used for reporting purposes so that reasonably consistent comparisons can be made.

Availability Index

Hours the FGD system is available for operation (whether operated or not) divided by hours in period, expressed as a percentage. This parameter tends to overestimate the viability of the FGD system because it does not penalize for election not to operate the system when it could have been operated. Boiler downtime may tend to increase the magnitude of the parameter because FGD failures generally cannot occur during such periods.

Reliability Index

Hours the FGD system was operated divided by the hours the FGD system was called upon to operate, expressed as a percentage. This parameter has been developed in order not to penalize the FGD system for elected outages, e.g., periods when the FGD system could have been run but was not run because of chemical shortages, lack of manpower, short duration boiler operations, etc. The main problem in using this

	formula is the concise determination whether or not the system was "called upon to operate" during a given time period. In addition, an undefined value can result when the FGD system is not called upon to operate for a given period (e.g., turbine or boiler outage when FGD system is available).
FGD Operability Index	Hours the FGD system was operated divided by boiler operating hours in period, expressed as a percentage. This parameter indicates the degree to which the FGD system is actually used, relative to boiler operating time. The parameter is penalized when options are exercised not to use the FGD system in periods when the system is operable. In addition, an undefined value can result when the FGD system is not called upon to operate for a given period (e.g., turbine or boiler outage when FGD system is available).
FGD Utilization Index	Hours that the FGD system operated divided by total hours in period. This parameter is a relative stress factor for the FGD system. It is not a complete measure of FGD system viability because the parameter can be strongly influenced by conditions that are external to the FGD system (e.g., infrequent boiler operation will lower the value of the parameter although the FGD system may be highly dependable in its particular application).
End Product	
Sludge	The SO_2 removed from the flue gas is not recovered in a usable or marketable form and resulting sulfur-bearing waste

	products must be disposed in an environmentally acceptable fashion.
Recoverable Byproduct	The SO_2 removed from the flue gas is recovered in a usable or marketable form (e.g., sulfur, sulfuric acid, gypsum, ammonium sulfate, sodium sulfate).
Energy Consumption, %	The percentage of gross unit electrical generating capacity consumed by the FGD system, as defined by the following equation: [Net MW w/o FGD - Net MW w/FGD]/ [Gross unit rating]
Equivalent Scrubbed Capacity (ESC)	The effective scrubbed flue gas in equivalent MW based on the percent of flue gas scrubbed by the FGD system.
FGD Status:	
Category 1	Operational - FGD system is in service removing SO_2.
Category 2	Under construction - ground has been broken for installation of FGD system, but FGD system has not become operational.
Category 3	Planned, Contract Awarded - contract has been signed for purchase of FGD system but ground has not been broken for installation.
Cateogry 4	Planned, Letter of Intent Signed - letter of intent has been signed, but legal contract for purchase has not been awarded.
Category 5	Planned, Requesting/Evaluating Bids - bid requests have been released but no letter of intent or contract has been issued.

Category 6	Considering only FGD Systems - an FGD system is proposed as a means to meet an SO_2 regulation.
Category 7	Considering an FGD system as well as alternative methods.
Category 8	Nonoperational - FGD system has been operated in the past but has been shut down permanently or for an extended indefinite period of time.
Fuel Firing Rate - TPH	Boiler fuel firing rate in terms of tons per hour at maximum continuous load.
Initial Start-Up (FGD System)	Date when flue gas first passes through any component of the FGD system (or is scheduled to do so).
New	FGD unit and boiler were designed at the same time or space for addition of an FGD unit was reserved when boiler was constructed.
Plant Name	Unit identification as it appears in Electrical World - Directory of Electrical Utilities, McGraw-Hill - Current Edition - or as indicated by utility representative for installations in planning stages.
Process Additives	A chemical compound or element which is added to the process or normally found with the main process reagent in small quantities (e.g., Mg, adipic acid) to promote improved process operation (e.g., scale reduction, increased SO_2 removal efficiency).
Process Type	Company name if process is patented. Generic name if several companies have similar processes (e.g., Lime, Limestone, Wellman Lord, Thoroughbred 121).

Regulatory Class	A. Unit(s) subject to Federal New Source Performance Standards (NSPS) promulgated in June 1979. B. Unit(s) subject to Federal New Source Performance Standards (NSPS) promulgated in December 1971. C. Unit(s) subject to standard(s) more stringent than NSPS (6/79). D. Unit(s) subject to standard(s) more stringent than NSPS (12/71), but not more stringent than NSPS (6/79) E. Unit(s) subject to standard(s) equal to or less stringent than NSPS (12/71).
Retrofit	FGD unit will be/was added to an existing boiler not specifically designed to accommodate FGD unit.
SO_2 Removal Mode	The manner in which the SO_2 from the flue gas is collected, e.g., wet scrubbing, spray drying, dry adsorption.
Spare Capacity Index - %	The summation of the individual component capacities (%) minus 100%.
Spare Component Index	The equipment spare capacity index (%) divided by the individual component capacity (%).
System Supplier	A firm that fabricates and supplies flue gas desulfurization systems.
Total Controlled Capacity (TCC)	The gross rating (MW) of a unit brought into compliance with FGD, regardless of the

	percent of flue gas treated at the facility. In the case of prototype and demonstration FGD systems, this figure will be identical to the Equivalent Scrubbed Capacity rather than the gross unit rating if the system is not meant to bring the facility into compliance with SO_2 emission standards.
Unit Rating	
Gross	Operational - Maximum continuous gross generation capacity in MW; Preoperational - maximum continuous design generation capacity in MW.
Net w/FGD	Gross unit rating less the energy required to operate ancillary station equipment, inclusive of emission control systems.
Net w/o FGD	Gross unit rating less the energy required to operate ancillary station equipment, exclusive of emission control systems.

APPENDIX C

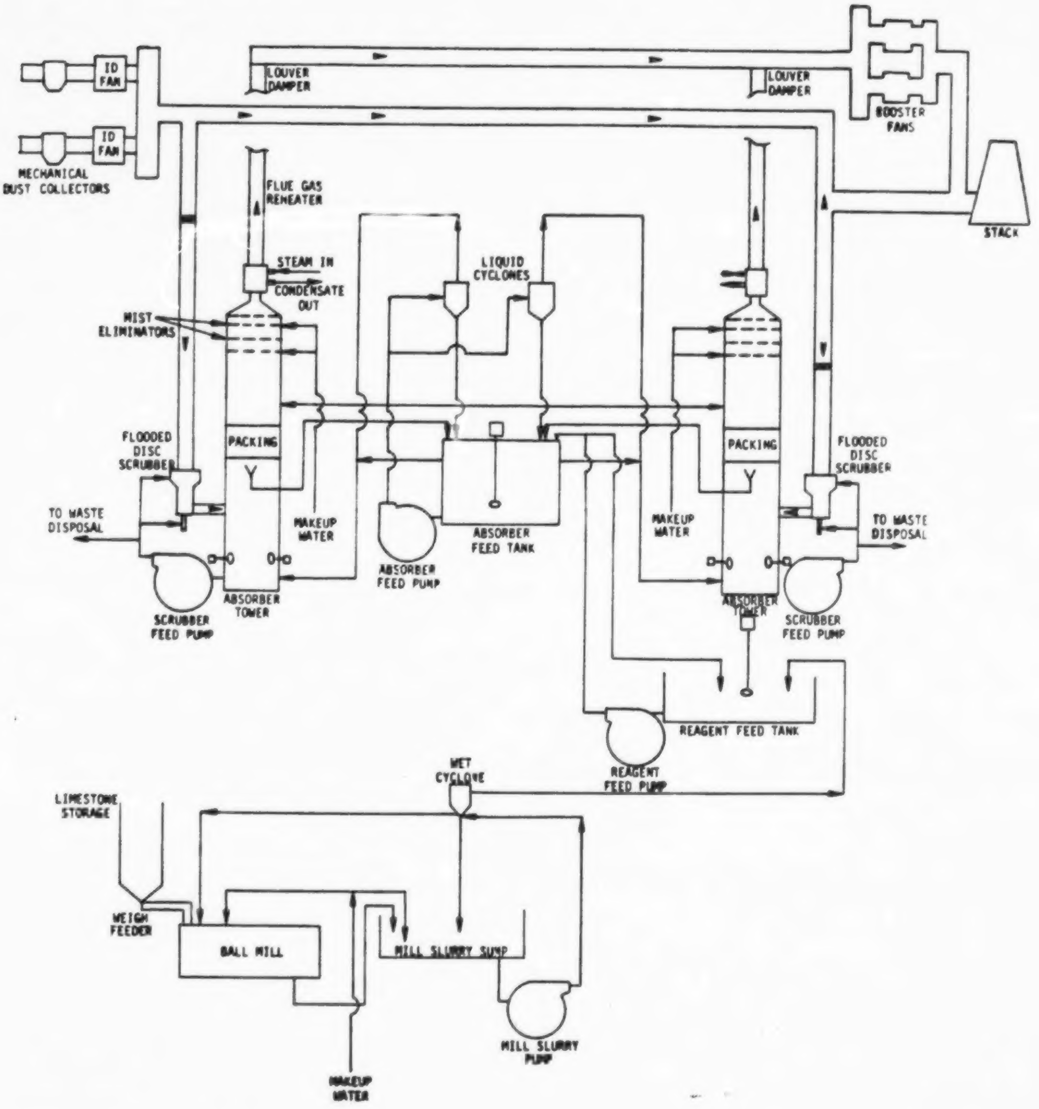
TABLE OF UNIT NOTATION

TABLE OF UNIT NOTATION

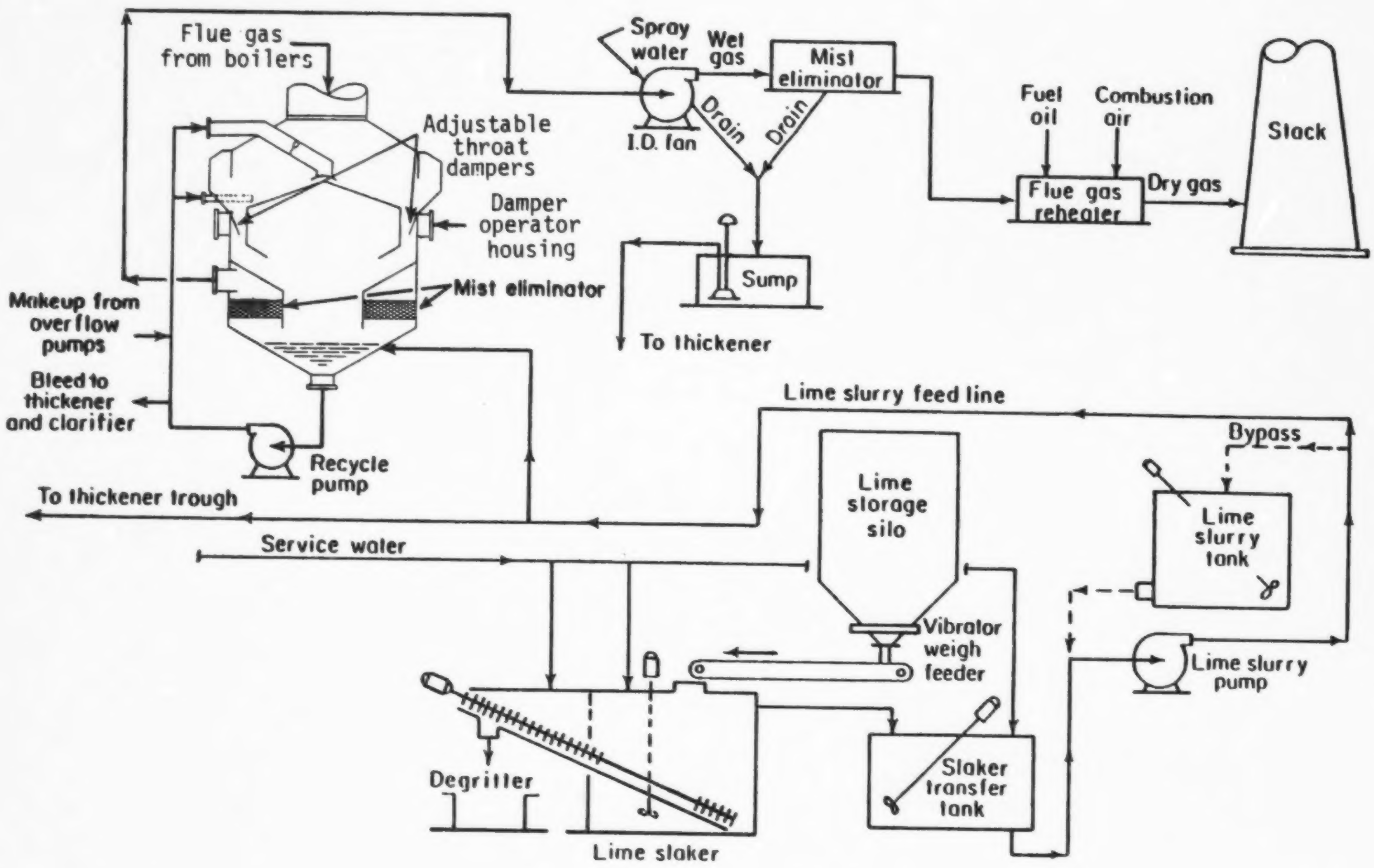
Classification	English Unit	Symbol	Survey Report Notation	ASTM/SI Unit	Symbol	Survey Report Notation
Area	Acre	acre	ACRE	Square meter	M^2	SQ.M
	Square foot	ft^2	SQ.FT	Square meter	M^2	SQ.M
Concentration	Grains per standard cubic foot	gr/scf	GR/SCF	Grams per cubic meter	g/m^3	G/CU.M
	Parts per million	ppm	PPM	Parts per million	ppm	PPM
	Pounds per million Btu	$lb/10^6$ Btu	LB/MMBTU	Nanograms per joule	ng/J	NG/J
Flow	Actual cubic feet per minute	ft^3/min (actual)	ACFM	Cubic meters per second	m^3/s	CU.M/S
	Gallons per minute	gal/min	GPM	Liters per second	liter/s	LITER/S
	Pounds per minute	lb/min	LB/MIN	Kilogram per second	kg/s	KG/S
	Ton per day	t/day	TPD	Metric ton per day	M t/d	M T/D
	Ton per hour	t/h	TPH	Metric ton per hour	M t/h	M T/H
Heat Content	Btu per pound	Btu/lb	BTU/LB	Joules per gram	J/q	J/G
Length	Foot	ft	FT	Meter	m	M
	Inch	in	IN	Centimeter	cm	CM
	Mile	mi	MI	Kilometer	km	KM
L/G Ratio	Gallons per thousand actual cubic feet	gal/1000 ft^3 (actual)	GAL/1000ACF	Liters per cubic meter	$liter/m^3$	LITER/CU.M
Mass/Weight	Pound	lb	LB	Kilogram	kg	KG
	Ton	t	T	Megagram	Mg	MG
Pressure	Inches of water	in. H_2O	IN. H_2O	Kilopascal	kPa	KPA
Temperature	Degree Fahrenheit	°F	F	Degree Celsius	°C	C
Volume	Cubic feet	ft^3	CU.F	Cubic meter	m^3	CU.M
	Acre-feet	Acre-ft	ACRE-FT	Cubic meter	m^3	CU.M

APPENDIX D

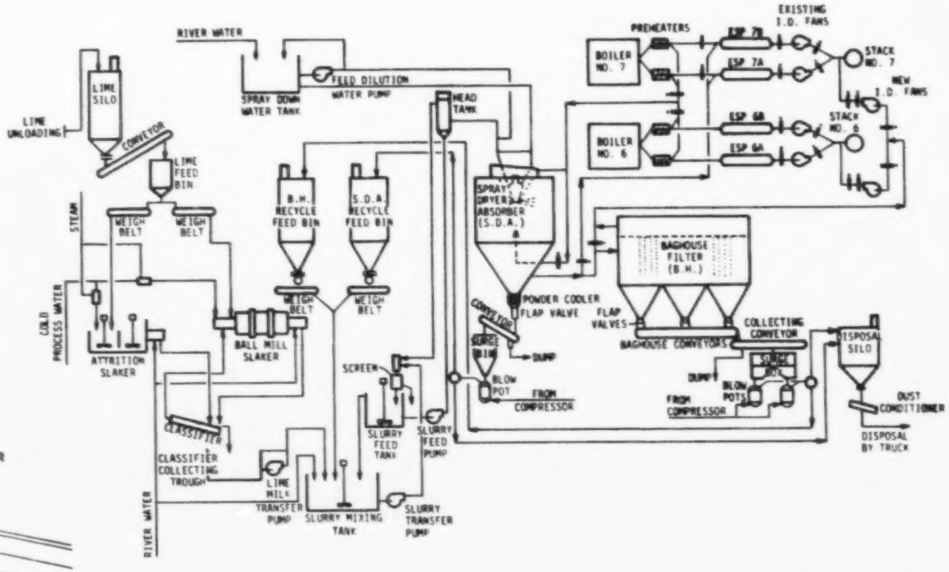
FGD PROCESS FLOW DIAGRAMS


ID FAN
ID FAN
MECHANICAL DUST COLLECTORS
LOUVER DAMPER
LOUVER DAMPER
BOOSTER FANS
STACK
FLUE GAS REHEATER
STEAM IN
CONDENSATE OUT
LIQUID CYCLONES
MIST ELIMINATORS
PACKING
FLOODED DISC SCRUBBER
TO WASTE DISPOSAL
MAKEUP WATER
ABSORBER TOWER
SCRUBBER FEED PUMP
ABSORBER FEED TANK
ABSORBER FEED PUMP
PACKING
FLOODED DISC SCRUBBER
TO WASTE DISPOSAL
MAKEUP WATER
ABSORBER TOWER
SCRUBBER FEED PUMP
REAGENT FEED TANK
REAGENT FEED PUMP
WET CYCLONE
LIMESTONE STORAGE
WEIGH FEEDER
BALL MILL
MILL SLURRY SUMP
MILL SLURRY PUMP
MAKEUP WATER

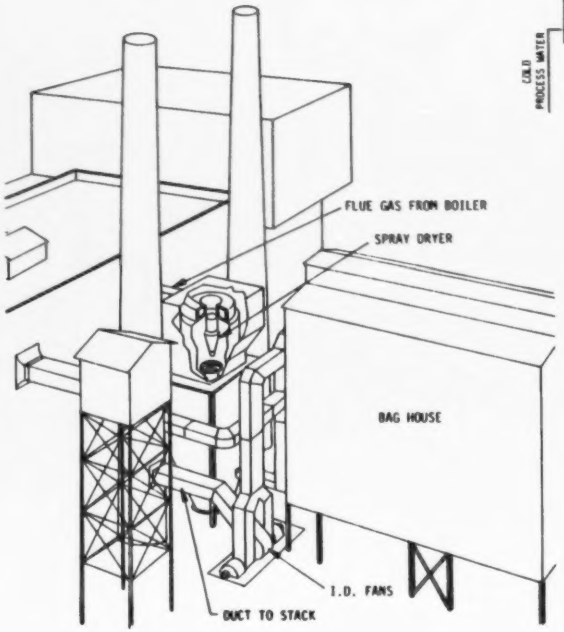
Arizona Public Service, Cholla 2:
Simplified Process Flow Diagram


Flue gas from boilers
Adjustable throat dampers
Damper operator housing
Mist eliminator
Makeup from overflow pumps
Bleed to thickener and clarifier
Recycle pump
To thickener trough
Spray water
Wet gas
I.D. fan
Mist eliminator
Drain
Drain
Sump
To thickener
Fuel oil
Combustion air
Flue gas reheater
Dry gas
Stack
Lime slurry feed line
Bypass
Service water
Lime storage silo
Lime slurry tank
Vibrator weigh feeder
Lime slurry pump
Degritter
Lime slaker
Slaker transfer tank

Duquesne Light, Elrama 1-4: Simplified Process Flow Diagram

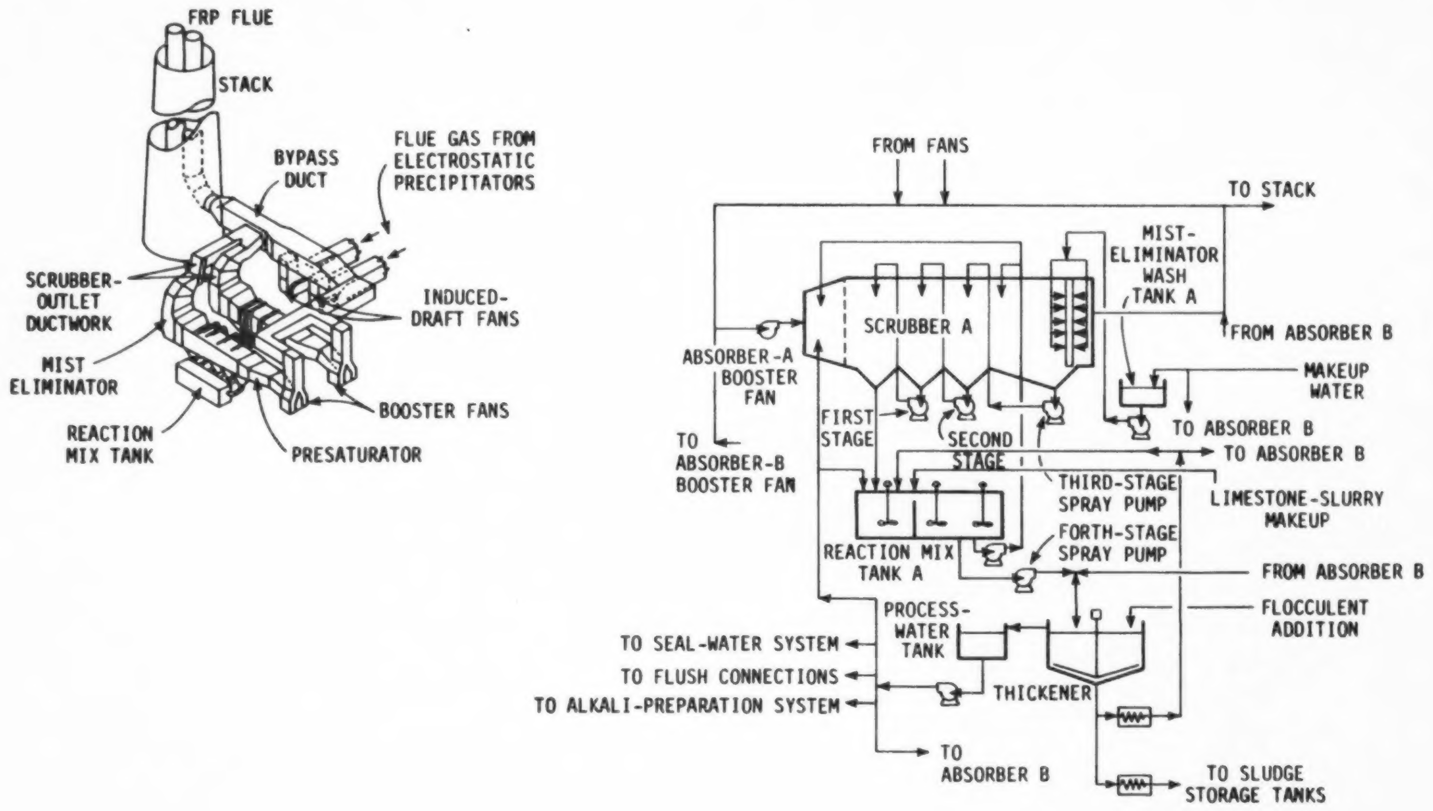

RIVER WATER
SPRAY DOWN WATER TANK
FEED DILUTION WATER PUMP
HEAD TANK
LIME SILO
LIME UNLOADING
CONVEYOR
LIME FEED BIN
STEAM
WEIGH BELT
WEIGH BELT
COLD PROCESS WATER
ATTRITION SLAKER
BALL MILL SLAKER
B.H. RECYCLE FEED BIN
S.D.A. RECYCLE FEED BIN
WEIGH BELT
WEIGH BELT
CLASSIFIER
CLASSIFIER COLLECTING TROUGH
RIVER WATER
LIME MILK TRANSFER PUMP
SLURRY MIXING TANK
SLURRY TRANSFER PUMP
SCREEN
SLURRY FEED TANK
SLURRY FEED PUMP
SPRAY DRYER ABSORBER (S.D.A.)
POWDER COOLER
FLAP VALVE
CONVEYOR
SURGE BIN
DUMP
BLOW POT
FROM COMPRESSOR
PREHEATERS
BOILER NO. 7
BOILER NO. 6
ESP 7B
ESP 7A
ESP 6B
ESP 6A
EXISTING I.D. FANS
STACK NO. 7
NEW I.D. FANS
STACK NO. 6
BAGHOUSE FILTER (B.H.)
FLAP VALVES
BAGHOUSE CONVEYORS
COLLECTING CONVEYOR
SURGE BOT
DUMP
BLOW POTS
FROM COMPRESSOR
DISPOSAL SILO
DUST CONDITIONER
DISPOSAL BY TRUCK

Simplified Process Flow Diagram

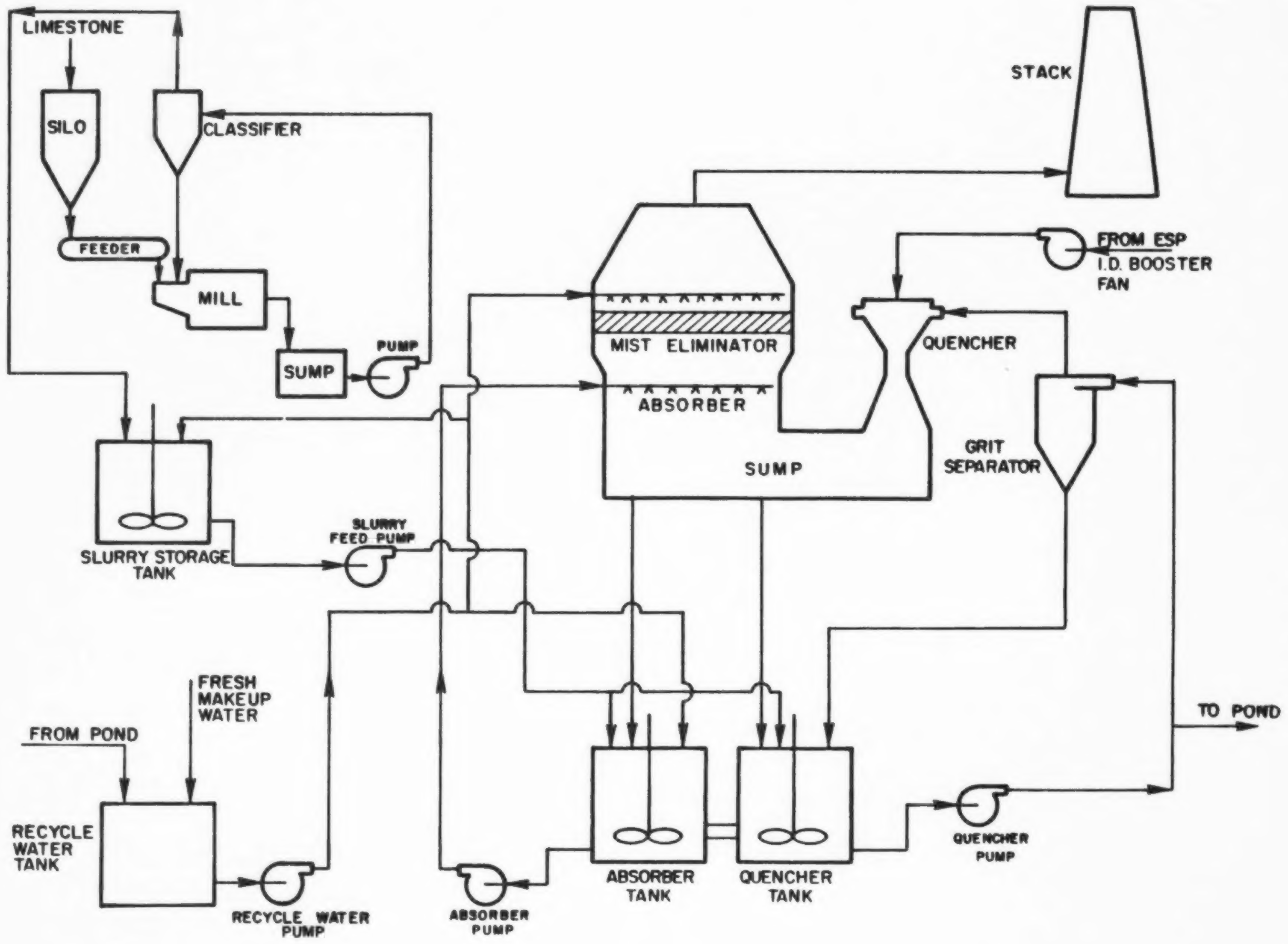

FLUE GAS FROM BOILER
SPRAY DRYER
BAG HOUSE
I.D. FANS
DUCT TO STACK

Spray Dryer Cutaway View

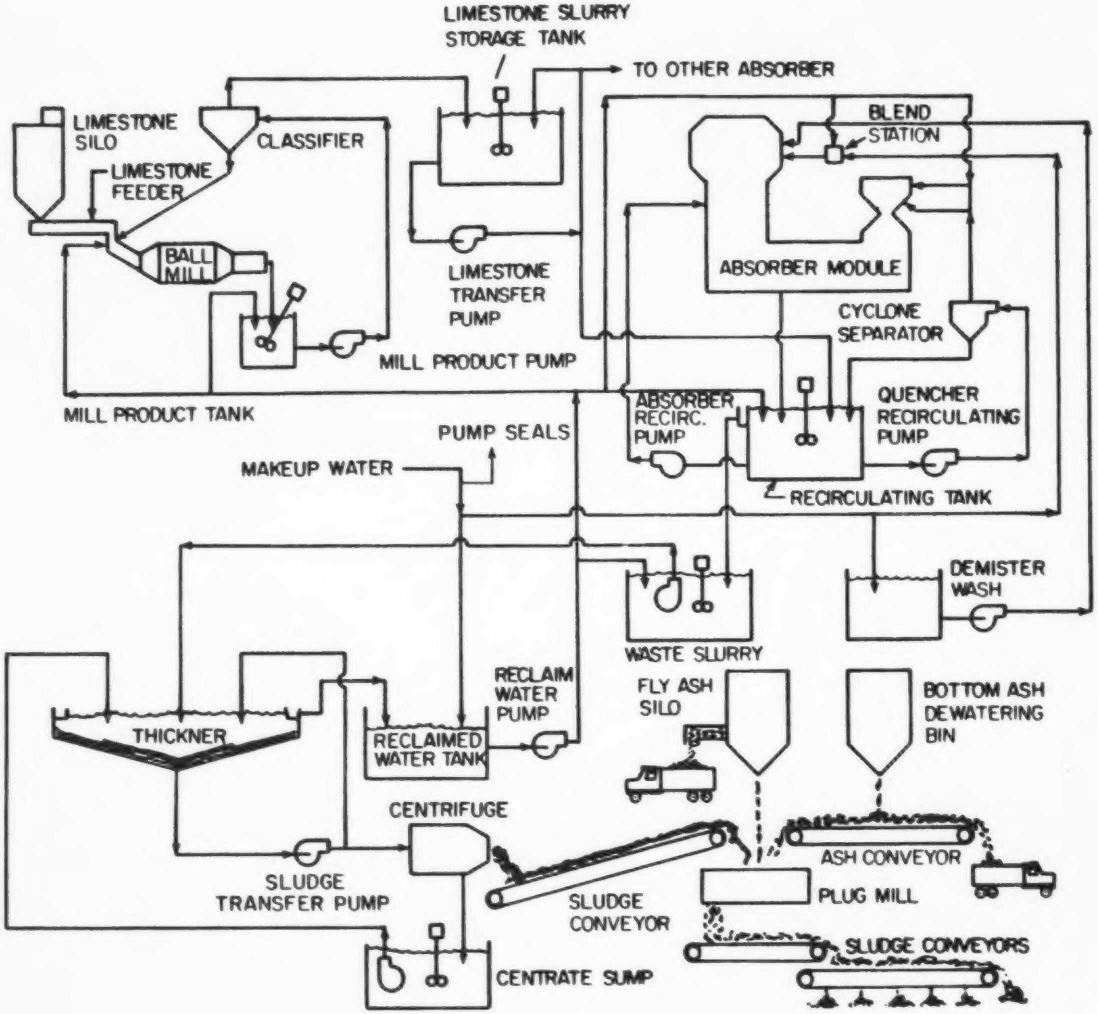
Northern States Power, Riverside 6,7: FGD System Flow Diagrams


FRP FLUE
STACK
BYPASS DUCT
FLUE GAS FROM ELECTROSTATIC PRECIPITATORS
SCRUBBER-OUTLET DUCTWORK
INDUCED-DRAFT FANS
MIST ELIMINATOR
BOOSTER FANS
REACTION MIX TANK
PRESATURATOR
FROM FANS
TO STACK
MIST-ELIMINATOR WASH TANK A
SCRUBBER A
FROM ABSORBER B
ABSORBER-A BOOSTER FAN
MAKEUP WATER
FIRST STAGE
SECOND STAGE
TO ABSORBER B
TO ABSORBER-B BOOSTER FAN
TO ABSORBER B
THIRD-STAGE SPRAY PUMP
LIMESTONE-SLURRY MAKEUP
FORTH-STAGE SPRAY PUMP
REACTION MIX TANK A
FROM ABSORBER B
PROCESS-WATER TANK
FLOCCULENT ADDITION
TO SEAL-WATER SYSTEM
TO FLUSH CONNECTIONS
THICKENER
TO ALKALI-PREPARATION SYSTEM
TO ABSORBER B
TO SLUDGE STORAGE TANKS

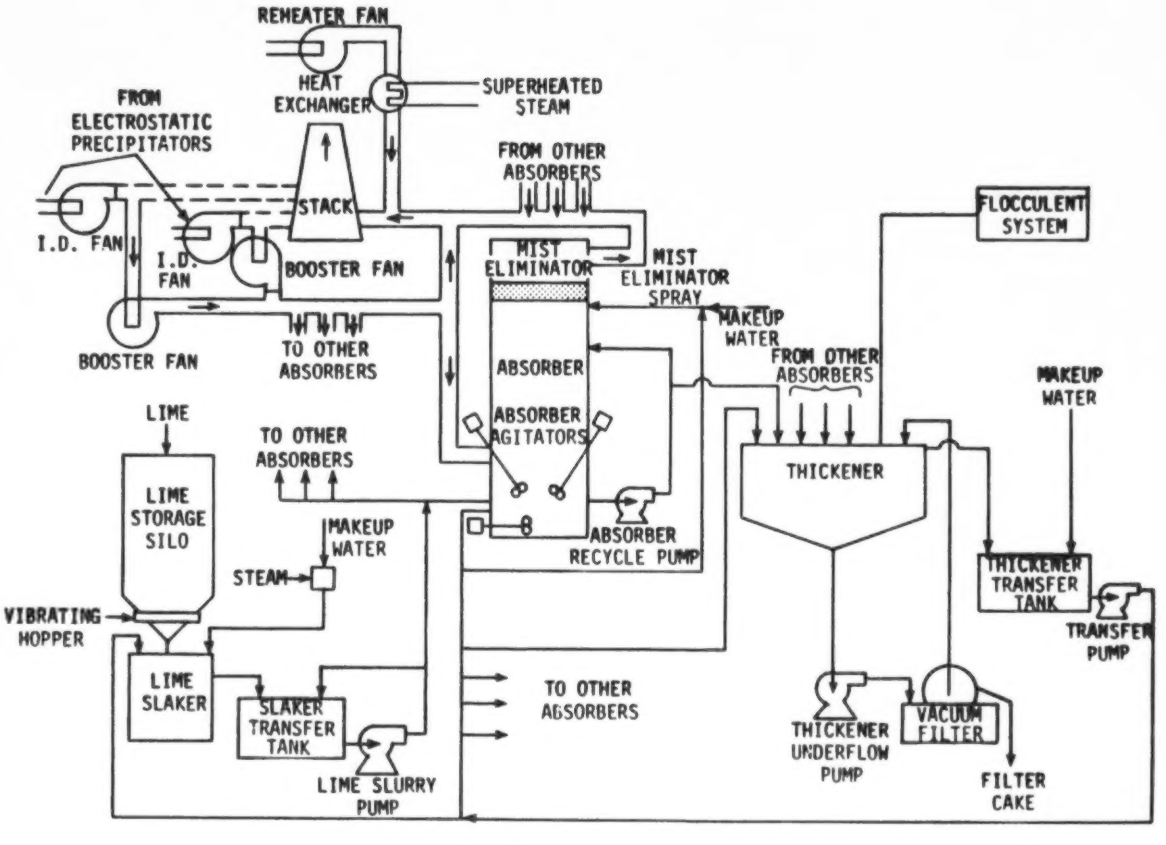
Salt River Project, Coronado 1 and 2 FGD System:
Simplified Process Flow Diagram


LIMESTONE
SILO
CLASSIFIER
FEEDER
MILL
SUMP
PUMP
SLURRY STORAGE TANK
SLURRY FEED PUMP
STACK
MIST ELIMINATOR
ABSORBER
SUMP
FROM ESP
I.D. BOOSTER FAN
QUENCHER
GRIT SEPARATOR
FROM POND
FRESH MAKEUP WATER
RECYCLE WATER TANK
RECYCLE WATER PUMP
ABSORBER PUMP
ABSORBER TANK
QUENCHER TANK
QUENCHER PUMP
TO POND

South Carolina Public Service Authority, Winyah 2: Simplified Process Flow Diagram


LIMESTONE SLURRY STORAGE TANK
TO OTHER ABSORBER
LIMESTONE SILO
CLASSIFIER
LIMESTONE FEEDER
BALL MILL
LIMESTONE TRANSFER PUMP
MILL PRODUCT PUMP
MILL PRODUCT TANK
BLEND STATION
ABSORBER MODULE
CYCLONE SEPARATOR
ABSORBER RECIRC. PUMP
QUENCHER RECIRCULATING PUMP
RECIRCULATING TANK
PUMP SEALS
MAKEUP WATER
DEMISTER WASH
WASTE SLURRY
RECLAIM WATER PUMP
FLY ASH SILO
BOTTOM ASH DEWATERING BIN
THICKNER
RECLAIMED WATER TANK
CENTRIFUGE
ASH CONVEYOR
SLUDGE TRANSFER PUMP
SLUDGE CONVEYOR
PLUG MILL
SLUDGE CONVEYORS
CENTRATE SUMP

Southern Illinois Power Coop, Marion 4: Simplified Process Flow Diagram


REHEATER FAN
HEAT EXCHANGER
SUPERHEATED STEAM
FROM ELECTROSTATIC PRECIPITATORS
STACK
FROM OTHER ABSORBERS
FLOCCULENT SYSTEM
I.D. FAN
I.D. FAN
BOOSTER FAN
MIST ELIMINATOR
MIST ELIMINATOR SPRAY
MAKEUP WATER
BOOSTER FAN
TO OTHER ABSORBERS
ABSORBER
FROM OTHER ABSORBERS
MAKEUP WATER
LIME
TO OTHER ABSORBERS
ABSORBER AGITATORS
THICKENER
LIME STORAGE SILO
MAKEUP WATER
ABSORBER RECYCLE PUMP
STEAM
THICKENER TRANSFER TANK
VIBRATING HOPPER
TRANSFER PUMP
LIME SLAKER
SLAKER TRANSFER TANK
TO OTHER ABSORBERS
THICKENER UNDERFLOW PUMP
VACUUM FILTER
LIME SLURRY PUMP
FILTER CAKE

Utah Power & Light, FGD System Simplified Process Flow Diagram for Hunter 1, 2 or Huntington 1